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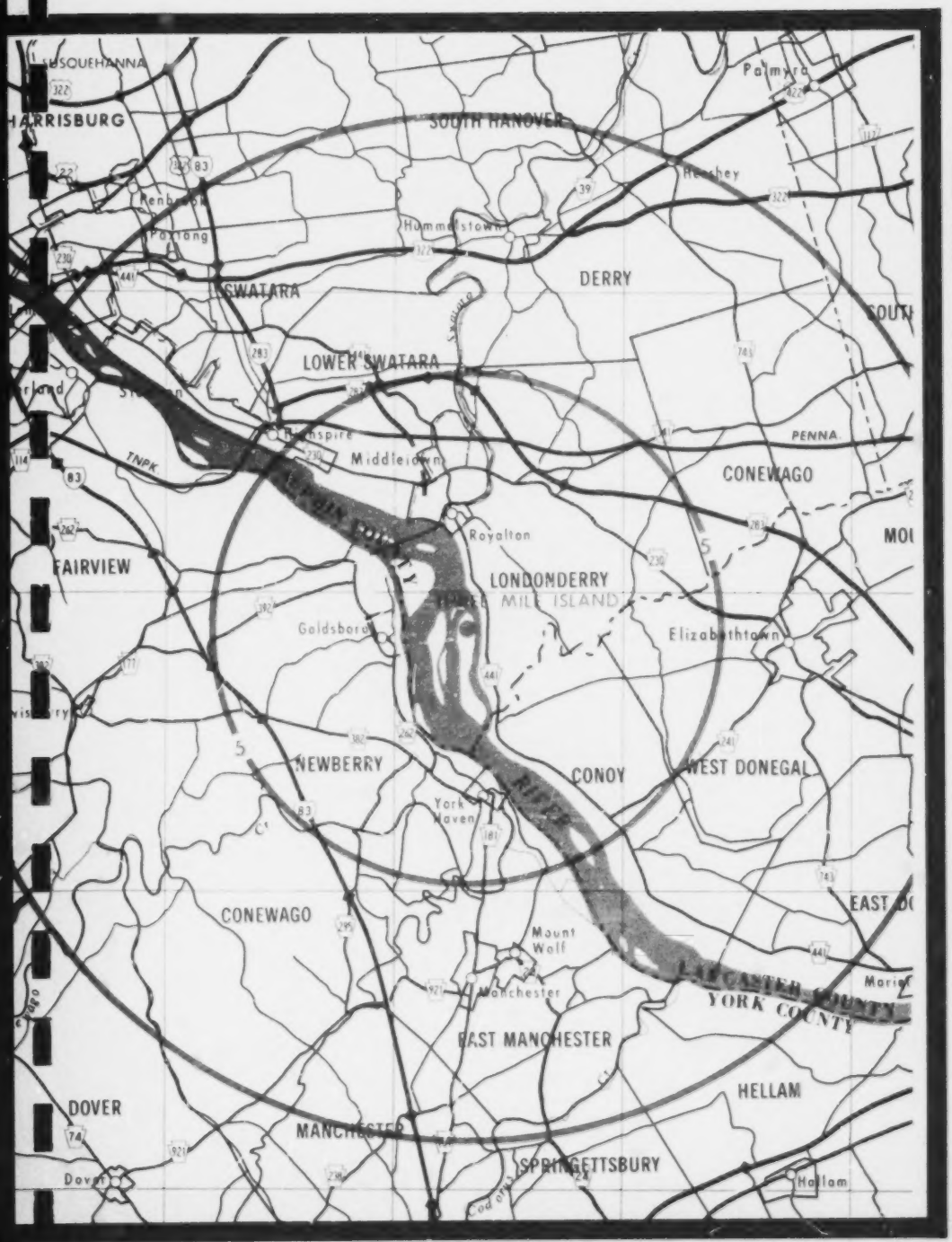

The Socio-Economic Impacts of the Three Mile Island Accident

Commonwealth of Pennsylvania

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THE SOCIO-ECONOMIC IMPACTS OF THE THREE MILE ISLAND ACCIDENT

FINAL REPORT

Commonwealth of Pennsylvania

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In Cooperation With:

The Department of Agriculture
The Department of Community Affairs
The Department of Commerce
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The Department of Labor and Industry
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EXECUTIVE SUMMARY

The Three Mile Island nuclear power plant accident had an immediate negative impact on the economy of the seven county area which surrounds the plant site. Yet these impacts were short-lived as the economy of southcentral Pennsylvania rebounded to normal levels within two weeks following the onset of the accident. By March, 1980 -- one year after the accident -- few continuing economic impacts were apparent, with the exception of the higher cost for electricity being paid by Metropolitan Edison customers.

The Three Mile Island accident was an unprecedented occurrence; clearly the worst operating incident in the 20-plus year history of non-military nuclear power use. It directly affected the lives of nearly 150,000 people who felt compelled to evacuate their homes, fleeing from a threat which was invisible, odorless, and soundless.

It was the voluntary evacuation which caused, almost without exception, the short-term economic losses. The evacuation itself was costly, and while estimates vary somewhat, it is generally agreed that the costs were as high as $10 million. With almost one-third of the population residing within 15 miles of the plant gone, the normal routine of life changed. Retail sales were lost, industrial production was interrupted, and normal business patterns were disrupted. Schools were closed, conventions were cancelled, and curfews were enforced in some of the communities near the plant. A crisis atmosphere had settled in.

Yet by April 6, 1979 -- one week later -- the crisis had largely passed as the situation at the plant had stabilized. The region returned to generally normal conditions as most of the evacuees had returned, schools were back in session, and other facilities had resumed operations.

The economic impacts of the TMI accident fall into two distinct categories. The immediate and short-term impacts, which were precipitated by the evacuation and are generally history. They can be addressed and measured with some degree of confidence. The long-term impacts, most notably the higher electricity costs being paid by Metropolitan Edison's customers, are now only definable in preliminary form. Each is addressed in summary form on the following pages.

Immediate and Short-Term Impacts

Manufacturing firms lost an estimated $7.7 million in value of production, with employees losing an additional $1.5 million in wages during the week of March 30, 1979 to April 6, 1979 in an approximate 20 mile radius of the TMI plant. Per employee, the lost value of production is an estimated $75. Durable goods industries accounted for almost 70 percent of the lost production -- about $5 million. Over the short term, March, 1979 to March, 1980, however, two-thirds of all firms reported the accident had no fiscal impact on their operations, while 60 percent of all firms reported the negative impacts were limited to the immediate one week period. Only seven percent of the manufacturing firms said the impacts continued for one full year.

Nonmanufacturing firms had losses in sales and services of about $74 million while lost wages for employees in this sector are estimated at $5.5 million within a six county area surrounding the plant. On a per-employee basis, the lost sales averaged $276. Hardest hit were services and the retail trades, which together accounted for 80 percent of all lost sales. Slightly less than half (47 percent) of the nonmanufacturing firms said their losses were confined to the first week following the accident, and the vast majority of all firms were back to normal operations by June, 1979.

Tourism - The tourist industry in southcentral Pennsylvania placed their TMI-related losses at $5 million -- generally confined to a period of one month following the accident. While tourism was off considerably during the 1979 season, the gasoline shortage and other localized factors were identified as paramount reasons; TMI was ranked as much less important. The 1980 tourist season, according to preliminary figures from the Pennsylvania Department of Commerce, was very good, indicating no continuing TMI-related impact.

Housing and property values were not, in general, significantly or negatively affected by the TMI accident. Residential property sales remained relatively strong throughout 1979 despite the accident and unfavorable mortgage market conditions. For the full year of 1979, total sales were down by 7.3 percent from 1978 levels for the entire 20 mile radius surrounding the plant. Sales in the five mile radius were not significantly lower than those in any other radii. Mortgage lending patterns, rental vacancies, and construction starts are about at normal levels. No pattern of disinvestment related to the accident was discovered.

Agriculture - The farm community, overall, reported minimal losses due to TMI, as 96 percent of farmers contacted within a 25 mile radius of TMI reported no economic losses due to the accident.

Public Sector - Extra public sector personnel expenses and increased administrative costs during the TMI accident cost state and local governments over $900,000. Expenditures for municipal capital investments were not impacted by TMI.

Long-Term Impacts

Cost of Electricity - Electricity rates being paid by customers of Metropolitan Edison have increased 50 percent over pre-accident levels and are subject to further cost pressures pending regulatory decisions.

Economic Perspective - The majority of both manufacturing and nonmanufacturing firms in the area view the decontamination of TMI as having no effect on their operations. They have no reservations on expanding their business in the aftermath of the accident and do not see the reactivation of both TMI reactors as having an impact on their operations.

Insurance claims paid to date as a result of TMI equal almost $1.5 million. In addition, a large number of lawsuits and claims related to the accident are pending. Resolution of these losses could take years.

1.0 SHORT TERM IMPACTS

1.1 The Accident

The Three Mile Island nuclear accident began in the early morning hours of March 28, 1979. At 4:00 a.m. on that day, a pump supplying water to TMI Unit 2's steam generator failed. Control rods stopped the fission process, the heart of the plant's nuclear reactor, which supplied electricity to parts of eastern and central Pennsylvania. A subsequent series of equipment malfunctions and human errors caused the core of the reactor to overheat, resulting in the release of radioactive gases into the surrounding environment.

In the days that followed there were additional, although minor, radiation releases as southcentral Pennsylvania became the focus of worldwide attention. As the situation at the plant seemingly continued to deteriorate, on Friday, March 30, Governor Dick Thornburgh, acting on the advice of federal officials, issued an advisory evacuation notice to pregnant women and pre-school children residing within a five mile radius of the plant.

1.2 The Evacuation

The Governor's voluntary evacuation advisory, uncertainty about the situation at the plant and conflicting and sometimes highly alarming information being released to the public led to the voluntary evacuation of an estimated 144,000 persons, or about 30 percent of the total population living within 15 miles of the plant site. Within a five mile radius of the plant, an area which includes parts of three counties, an estimated 55 percent of the population evacuated. In the five to ten mile radius, 56,000 persons evacuated. In the ten to 15 mile radius which contains the bulk of the area's population, including the City of Harrisburg, an estimated 67,000 people evacuated.

The estimate of the number of persons who evacuated is based on data from a Nuclear Regulatory Commission (NRC) survey of 1,500 households within a 55 mile ring around TMI. The survey was published in October, 1979.

An analysis of household evacuation behavior reveals that the older the head of the household, the less likely the household evacuated. Families with children and higher than average levels of educational attainment were more likely to evacuate. Generally, the presence of pregnant women and

family size correlated positively to the evacuation decision, especially in the five mile radius. In general, those who evacuated had a higher family income than those who did not.

While the majority of those who evacuated did so on March 30, the day of the Governor's advisory, when concern was at its highest, a surprising portion -- 15 percent -- left prior to that day. While the great majority of those who evacuated remained in Pennsylvania (72 percent), 21 states received evacuees including Florida, California and Oklahoma. The median distance traveled by evacuees was 100 miles. The median date the evacuees returned was April 4, indicating an average evacuation period of five days.

The total estimated economic cost of the evacuation has been placed at $9.8 million.[1/] In the NRC study, this amounts to an average of almost $200 per household, or $68 per person. Most wage losses are not included in this figure since the impacts on wages in the manufacturing and nonmanufacturing sectors are addressed in detail in the body of this report.

1.3 Consequences of the Evacuation

It was the voluntary evacuation which primarily caused the short-term economic losses of the TMI-2 accident. With a significant segment of the population in the TMI area gone, retail sales were lost, industrial production schedules were interrupted and normal business patterns were disrupted. Schools were closed, meetings were cancelled and curfews were in effect in parts of the greater TMI area.

There were also other impacts which rippled throughout the region's economy. Conventions were cancelled, tourists avoided the area, and locally produced farm products were boycotted for a short period of time. Signs proclaiming "No Pennsylvania Milk Sold Here" were displayed in parts of the northeast.

Yet, by April 6, 1979, the area had returned to near normal conditions. Almost all of the evacuees had returned as the crisis at the plant was over. Schools and other facilities reopened and the daily routine of life was resumed.

[1/] The Pennsylvania Department of Health, in its report, Health Related Economic Costs of the Three Mile Island Accident, has estimated the cost of the evacuation at $5.8 million to $9.0 million. This variation is due to the use of mean and median values to estimate total cost figures.

2.0 MANUFACTURING

While the TMI accident had a significant and immediate impact on manufacturing industries within an approximate 20 mile radius of the nuclear plant, the economic losses were essentially limited to the first week immediately following the accident. These losses were estimated to have been about 188,000 man-hours of work, over $1.5 million in lost wages, and approximately $7.7 million in lost value of production.

In absolute terms, these losses were greatest among large manufacturing establishments. But viewed from an average per-employee basis, it was the smaller firms which sustained the brunt of the losses.

Concurrent with these fiscal impacts there occurred some disruptions in the supply of materials and in the marketing of finished products. But only a relatively few of the manufacturing establishments were so affected, with most of them being small plants.

Examination of data concerning unemployment claims filed because of the accident indicates that the employment impacts were both minimal and short-lived. Except for the first two or three weeks, employment in the counties around TMI was essentially unaffected by the accident.

Considering the entire one year period after March 30, 1979, the economic effects on the manufacturing economy have not been widespread. Among the more than 1,100 manufacturing establishments within an approximate 20 mile radius of the nuclear plant, only 20 percent have experienced any negative fiscal impact related to the TMI accident. Two-thirds have felt no fiscal impact at all. The losses sustained during the year were principally those experienced during the first week -- such losses terminated after the immediate period for almost 60 percent of all the establishments affected by the accident. And, by the end of June, 1979, such losses were over for more than two-thirds of them. Year-long losses (March 28, 1979 to March 30, 1980) were claimed by only seven percent of the establishments affected by the accident.

Some of the manufacturing losses of the immediate period were recouped during the remainder of 1979 and the first quarter of 1980, especially the man-hour and wage losses. This was accomplished through the firms' applying longer working hours and encouraging higher productivity.

Altogether, 56 percent of the manufacturing establishments experiencing losses at some time during the year-long period

had virtually recovered all of these losses by the end of March, 1980. On the other hand, about one-third of them were not able to recoup any, or nearly any, of their losses. Indications are that the food processing industry has not recovered to the extent as has the manufacturing sector as a whole. A similar experience can be found in both the durable and non-durable groups within the manufacturing sector.

The effects of TMI on the product image of manufacturers within the area has been quite small. Only around seven percent of all establishments expressed the opinion that TMI was negatively affecting the image of their businesses in March, 1980. This is in about the same range as the share which expressed an image effect at the time of the accident. So the perception of a negative image effect has neither significantly improved nor worsened over the past year.

Analysis of trends in both total employment and manufacturing employment indicate no notable impact of TMI. There have occurred seasonal changes in employment trends and a general slackening in availability of jobs, especially since late 1979 and the beginning of 1980. But the sluggishness in employment growth has been reflective of state and national economic malaise brought on by factors other than TMI, such as increased costs of energy, raw materials and supplies, as well as climbing interest rates on borrowed capital.

Manufacturing industries are an important component of the structure of southcentral Pennsylvania's economy. In an approximate 20 mile radius incorporating all or parts of a seven county area surrounding Three Mile Island, there are 1,141 manufacturing firms employing 101,749 persons. Leading industries include: food and kindred products; publishing, printing and allied industries; and non-electrical machinery.

The impacts of the TMI-2 accident on manufacturing enterprises are addressed in the following section, which is divided into two parts: first, the immediate impacts which occurred during the first week following the accident (March 30, 1979 to April 6, 1979) are examined; while the second part addresses the effects over a full one-year period (March, 1979 through March, 1980).

The data presented in the second part was derived primarily from a large data collection effort undertaken by the Pennsylvania Department of Commerce in the spring of 1980. A discussion of the sampling techniques and methods utilized in this effort can be found in Appendix B. Information related to the immediate impact period is a result of an earlier effort in May, 1979.

2.1 Immediate Impacts

2.1.1 All Manufacturing Firms

The TMI-2 accident had an immediate impact on manufacturing industries during the one-week period of March 30, 1979 to April 6, 1979. Wages, man-hours worked and value of production were all adversely affected at the levels shown in Table 2A. The Pennsylvania Department of Commerce found, however, that most manufacturing firms had returned to normal business levels by April 4, 1979, indicating that most losses had been confined to a time span of considerably less than one full week.

The larger establishments, those with over 100 employees, experienced the greatest losses due to TMI -- 75 percent of the lost man-hours, 66 percent of the lost wages, and 89 percent of the lost value of production.

2.1.2 Food Processing Firms

As a part of the Commerce Department's initial data collection effort, special emphasis was placed on determining the impacts of the accident on the food processing industries (SIC 20) as compared to other manufacturing. Losses in man-hours, wages and value of production which occurred during the first week following the TMI accident in this sector are shown in Table 2B. On an average per-employee basis, these establishments lost less than the average experienced for all other manufacturing groups.

2.1.3 Man-Hours Lost

As Table 2A shows, employees in manufacturing establishments were away from work for about two hours during the first week as an average, but some employees lost more time from work. For example, the average man-hours lost per employee in some non-food establishments having 500 to 999 employees was nearly five hours. And although employees in food and kindred products lost an average of one hour, employees in small food firms (zero to 19 workers) lost 2.3 hours.

2.1.4 Wages Lost

The absenteeism and layoffs in manufacturing resulted in an average per-employee wage loss of around $15. As was the case in lost man-hours, the food and kindred products workers seemed to have lost less wages during the immediate period.

Table 2 A

TMI RELATED LOSSES
MARCH 30, 1979 TO APRIL 6, 1979

	Total[1/]	Average per Employee[2/]	Under 100 Employees	Over 100 Employees
Man-Hours Lost	187,973	1.8	46,951	141,022
Wages Lost	$1,515,509	$14.90	$506,702	$1,008,807
Value of Production Lost	$7,672,820	$75.40	$845,815	$6,827,005
Number of Establishments	1,141		935	206
Average Value of Production Loss per Establishment	$ 6,725		$ 905	$ 33,141

1/ Includes totals for all manufacturing establishments.

2/ Total man-hours lost, wages and value of production in universe divided by total 1978 manufacturing employment.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning

Table 2 B

TMI RELATED LOSSES, FIRST WEEK
FOOD PROCESSING (SIC 20) AS COMPARED
TO ALL OTHER MANUFACTURING

	Total Loss in SIC 20	Average Loss Per Employee		
		SIC 20	Non-food SIC's	All Manufacturing
Man-Hours	12,937	1.0	2.0	1.8
Wages	$ 71,905	$ 5.80	$16.20	$14.90
Value of Production	$143,691	$11.50	$84.30	$75.40

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

In some other establishments, losses were greater; for example, non-food firms employing 500 to 999 workers lost an average of $31 in wages per employee, which was about twice the overall average. Average lost wages in food establishments amounted to $6, but for some smaller food firms (20 to 99 employees) the losses averaged $13 in wages per employee.

2.1.5 Losses in Value of Production

The overall average loss in value of production for all manufacturing establishments was $75 per employee. But those large non-food firms (500 to 999 employees) mentioned previously, which experienced the greatest average time and wages lost per employee, also had the greatest loss in value of production -- an average of almost $303 per employee. The average loss in value of production for all establishments having more than 100 employees was $85 per employee. In contrast, all of the food and kindred products establishments sustained an average value of lost production of only about $12. However, smaller food manufacturing establishments in the employee range of 20 to 99 lost an average of $43 per employee.

2.1.6 Supply and Marketing Disruptions

During the time period immediately following the accident, there was some disruption in the supply of raw materials and other products necessary to the manufacturing process. Disruptions in the marketing of finished products and goods to consumers or users also occurred and was more of a problem.

Almost seven percent of the total manufacturing firms experienced disruptions in supply of products purchased and almost 12 percent experienced disruptions in marketing of products sold. (See Table 2C.) These disruptions mainly affected smaller establishments, probably because they tend to both obtain materials and market their products locally. Of the firms affected by disruptions in supply of materials, 88 percent had less than 100 employees. Within this size group (less than 100 employees) nearly one-half of those operated by the self-employed experienced disruptions in their supplies of products purchased. Eighty-nine percent of the firms experiencing disruption in marketing also had less than 100 employees. Such firms probably were affected by having capital tied up in undelivered products.

Disruptions in marketing were felt more by food and kindred products establishments than the average for all other SIC

Table 2 C

INDUSTRIAL DISLOCATION

	Total Disruptions	% of Total Establishments	Less Than 100 Employees	% of Small Establishments	More Than 100 Employees	% of Large Establishments
Disruption in Receiving Supply of Products						
SIC 20	11	7.4	10	7.9	1	4.6
All Other SICs	67	6.8	59	7.3	8	4.4
Total	78	6.8	69	7.4	9	4.4
Disruption in Marketing Products						
SIC 20	22	14.9	17	13.5	5	22.7
All Other SICs	111	11.2	101	12.5	10	5.4
Total	133	11.7	118	12.6	15	7.3
Number of Establishments						
SIC 20	148	100.0	126	85.1	22	14.9
All Other SICs	993	100.0	809	81.5	184	18.5
TOTAL	1141	100.0	935	82.0	206	18.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

categories. They experienced twice as many marketing disruptions as they did disruptions in obtaining supplies.

There were several reasons for these marketing and supply disruptions. Because of the voluntary evacuation, there was less capability of providing timely delivery of materials for processing or the shipping of finished products. In addition, there would have been a reduced market for manufactured products since some outlets closed temporarily (e.g., stores and restaurants). People in the area were concerned and became more selective in their purchases. This selectivity particularly affected the food processing establishments rather than the average of all the non-food processing categories.

It is likely that the food products marketing problem resulted from immediate consumer resistance at the time of the accident to locally produced agricultural products and to temporary losses of sales because of a decreased demand resulting from people having evacuated the area. Several dairies in the Harrisburg area reported a short-lived decrease in sales. The fact that numerous restaurants and schools in the area were closed for several days would also account for some decrease in consumer demand. Aside from consumer resistance to food products, the supply of certain raw materials sensitive to potential radiation could also have been subject to resistance by manufacturers.

A Teamsters' strike began during the immediate period following the accident, and some firms reported that this strike was more disruptive than the TMI accident.

2.1.7 Unemployment Claims

Claims data from the Office of Employment Security in the Pennsylvania Department of Labor and Industry indicate that the effects of the accident were short-lived. Indeed, except for the first few weeks, the TMI incident had little impact on employment and unemployment rates in the area. Even during its initial stage the impact was minimal. Records of the Office of Employment Security reveal that there were only 721 initial claims and 1,489 continued claims filed related to the TMI accident. The bulk of these claims were filed in the Harrisburg, Lancaster and York local offices, which generally serve the area within an approximate 20 mile radius of TMI.

An initial claim represents either a claim filed by someone who has not been unemployed before and is making his first claim, or someone who has had a previously disrupted employ-

ment record and is not making an additional claim. Not every initial claim becomes eligible for compensation. Once an initial claim has been filed, it must be renewed weekly if the unemployment continues, and each of these renewals is counted as a continued claim. In order to be eligible for unemployment compensation, the claimant had to be told by his employer not to report for work and had to remain in the area. Therefore, the data does not reflect those who voluntarily evacuated while their employer remained in operation. Some of the continued claims represent persons who were out of work for several weeks.

In order to present a complete picture concerning unemployment claims, data on both manufacturing and nonmanufacturing sectors are provided in this chapter.

Table 2D shows that 482 persons in the manufacturing sector filed initial claims -- comprising 68 percent of the total. Although there were 457 continued manufacturing claims, their share of the total was only 31 percent of all continued claims. This decrease in percentage share (in manufacturing) is attributable to the occurrence of more continued claims in the nonmanufacturing sector. Most of the nonmanufacturing sector continued claims were in the construction category.

The construction claims do not encompass the general construction field such as home building, but rather reflect claimants engaged at TMI in specialized maintenance.

Most of the claim activity shown in Table 2D occurred in the month of April, 1979 with the exception of the construction industry. Around 75 percent of the initial claims (approximately 540) were made in the first week, and the bulk of these were partial claims which represented only a few lost days of work. Since only 482 of the initial claims were in the manufacturing sector, and since the total 1978 manufacturing employment in an approximate 20 mile radius was about 102,000 employees, the share of manufacturing employees filing initial claims is well below one percent of the total manufacturing employment.

2.2 Short-Term Impacts

This section of the report presents impacts of TMI which have taken place over the one year time span since the accident. These impacts will deal with the nature, magnitude and length of fiscal effects, image problems, and a discussion of the degree of recovery from the impacts of the accident.

Table 2 D

UNEMPLOYMENT CLAIMS RELATED TO TMI

Industry	Initial	Continued
Apparel	13	13
Printing & Publishing	4	4
Fabricated Metals	1	1
Machinery (except electrical)	1	1
Transportation Equipment	27	27
Misc. Manufacturing	436	411
Total Manufacturing	482	457
Agriculture Services	2	7
Construction	152	942
Transportation & Public Utilities	3	10
Services	82	73
Total Nonmanufacturing	239	1,032
TOTAL	721	1,489

SOURCE: Pennsylvania Department of Labor and Industry, Office of Employment Security; June 1980.

In the spring of 1980, the Department of Commerce collected information from the manufacturing firms in the region surrounding the plant to determine if the impacts of the accident were continuing and if TMI losses had been recouped throughout the last three-quarters of 1979 and the first quarter of 1980. The results of this effort are detailed in the following pages.

2.2.1 Overall Fiscal Effects

Of all the manufacturing firms which are located within an approximate 20 mile radius of Three Mile Island, nearly two-thirds reported that the accident had no fiscal impact on their operations during the past year. But over 20 percent indicated that the TMI accident did have a negative effect; smaller establishments were affected to a slightly greater extent. In addition, 12 percent were unsure of the fiscal impact on their establishments. (See Table 2E.)

In examining those establishments which asserted that TMI did have a negative impact on their operations, it appears that the greater share (52 percent) of the negative fiscal impacts were felt in the non-durable group. This contrasts with the fact that the area of study has a greater share of durable goods firms. And among the establishments negatively affected, the highest percentage is among the large durable goods firms, followed by the small non-durable goods firms. (See Table 2F.)

2.2.2 Net Losses in Value of Production

Total dollar losses in value of production for those manufacturing firms negatively affected due to the TMI accident during the past year exceeded $7 million. (See Table 2G.) The durable goods group of industries suffered almost 70 percent of this loss -- about $5 million. Generally, larger firms had greater losses than smaller firms, with the exception of food and kindred products industries. Since there were more small firms with negative fiscal effects, this would indicate that the losses per establishment were much larger in large establishments. While the food processing industry losses were less than ten percent of those for all manufacturing, they were highly concentrated in the smaller establishments. It is significant to note that over 50 percent of total losses in value of production occurred in the group called "all other durable goods". The bulk of these losses (90 percent) were reported by the transportation equipment (SIC 37) category, and a smaller share (about six percent) were reported by the lumber and wood products (SIC 24) industry.

Table 2 E

TMI'S FISCAL IMPACTS ON MANUFACTURING ESTABLISHMENTS
MARCH, 1979 - MARCH, 1980

	Small Establishments		Large Establishments		All Establishments	
Type of Impact	Number	% of Total	Number	% of Total	Number	% of Total
Positive	1	0.1	0	0	1	0.1
Negative	204	21.8	41	19.9	245	21.5
No Effect	599	64.1	143	69.4	742	65.0
Not Sure	116	12.4	21	10.2	137	12.0
Unknown	15	1.6	1	0.5	16	1.4
TOTAL MFG.	935	100.0	206	100.0	1,141	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 F

NEGATIVE FISCAL IMPACTS ON MANUFACTURING GROUPS
BY SIZE OF ESTABLISHMENT
MARCH, 1979 - MARCH, 1980

	Negative Effect					
Group	Small	%	Large	%	All	% of Total
Durable Goods						
Primary & Fabricated Metals	24	11.8	4	9.8	28	11.4
Machinery, incl. Electrical	29	14.2	9	21.9	38	15.5
All Other Durable Goods	42	20.6	10	24.4	52	21.2
Total Durable Goods	95	46.6	23	56.1	118	48.1
Nondurable Goods						
Food & Kindred Products	25	12.2	2	4.9	27	11.0
Textile Mill & Apparel Products	0	0.0	6	14.6	6	2.5
All Other Nondurable	84	41.2	10	24.4	94	38.4
Total Nondurable Goods	109	53.4	18	43.9	127	51.9
TOTAL MANUFACTURING	204	100.0	41	100.0	245	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 G

NET VALUE OF PRODUCTION LOST BY MANUFACTURING GROUP AND ESTABLISHMENT SIZE
MARCH, 1979 - MARCH, 1980

Group	Small Establ. No.	Small Establ. % of Total Mfg.	Large Establ. No.	Large Establ. % of Total Mfg.	All Establ. No.	All Establ. % of Total Mfg.
Primary & Fabricated Metals	$92,000	2.8	$193,500	4.8	$285,500	3.9
Machinery, including Electrical	228,500	6.8	730,400	18.2	958,900	13.0
All other Durable Goods	1,929,256	57.9	1,907,883	47.4	3,837,139	52.2
Total Durable Goods	$2,249,756	67.5	$2,831,783	70.4	$5,081,539	69.1
Food & Kindred Products	589,839	17.7	51,750	1.3	641,589	8.7
Textile Mill & Apparel Products	0	0	386,504	9.6	386,504	5.3
All other Nondurable Goods	$491,503	14.8	$752,150	18.7	$1,243,653	16.9
Total Nondurable Goods	$1,081,342	32.5	$1,190,404	29.6	$2,271,746	30.9
TOTAL MANUFACTURING	$3,331,098	100.0	$4,022,187	100.0	$7,353,285	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

2.2.3 Net Man-Hour Losses

During the same period of time, man-hours of work lost due to the accident amounted to over 137,000 hours. As with value of production, man-hour losses were greater in the durable goods sector. Almost 60 percent of the losses occurred here. Large durable goods firms experienced about 53 percent of all the man-hours lost in the manufacturing sector. And in the non-durable group, it was the small firms which had the greater man-hours lost (about 22 percent of the total 137,000 hours lost). (See Table 2H.)

Among the durable goods industries, large losses in man-hours were reported in the machinery category (SIC 35) and transportation equipment (SIC 37). Among non-durable, large losses were reported by food (SIC 20), apparel (SIC 23), printing and publishing (SIC 27), and leather products (SIC 31).

2.2.4 Net Wages Lost

Wages lost as a result of the TMI accident total over $1.1 million. Table 2I indicates that wage losses were heaviest in the durable goods sector (71 percent), with larger firms showing higher losses than the smaller firms. Because there were more man-hours lost in large firms, it should be expected that there would be more wages lost among large firms as well.

2.2.5 Average Losses

While the preceding paragraphs have described the losses in absolute terms, more meaningful comparisons can be made when the data is reduced to an average per-employee or an average per-establishment basis. This is shown in Table 2J. It is apparent that the largest losses per employee in wages, man-hours and value of production occurred among the small establishments. In every case shown in Table 2J, the per-employee year-long losses were greater in small establishments. The losses per employee were often two or three times larger in small establishments -- for example, overall wages lost per employee were almost twice as great, and, in food, they were about six times as large. Losses in value of production were much larger per establishment in the case of large firms, however.

Within the group called "all others" there are, of course, many individual two-digit SIC industries. Within these industries the losses per employee for some of them appear to have been much larger than the average overall figure for

Table 2 H

NET MAN HOURS LOST BY MANUFACTURING
GROUP AND ESTABLISHMENT SIZE
MARCH, 1979 - MARCH, 1980

Group	Small Establ. No.	Small Establ. % of Total Mfg.	Large Establ. No.	Large Establ. % of Total Mfg.	All Establ. No.	All Establ. % of Total Mfg.
Primary & Fabricated Metals	788	2.0	8,600	8.7	9,388	6.8
Machinery, including Electrical	6,768	17.7	20,926	21.1	27,694	20.1
All other Durable Goods	867	2.3	43,753	44.1	44,620	32.5
Total Durable Goods	8,423	22.0	73,279	73.9	81,702	59.4
Food & Kindred Products	9,336	24.4	7,057	7.1	16,393	11.9
Textile Mill & Apparel Products	0	0	5,706	5.7	5,706	4.2
All other Nondurable Goods	20,487	53.6	13,173	13.3	33,660	24.5
Total Nondurable Goods	29,823	78.0	25,936	26.1	55,759	40.6
TOTAL MANUFACTURING	38,246	100.0	99,215	100.0	137,461	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 I

NET WAGES LOST BY MANUFACTURING
GROUP AND ESTABLISHMENT SIZE
MARCH, 1979 - MARCH, 1980

Group	Small Establ. No.	Small Establ. % of Total Mfg.	Large Establ. No.	Large Establ. % of Total Mfg.	All Establ. No.	All Establ. % of Total Mfg.
Primary & Fabricated Metals	$1,806	0.5	$61,700	8.3	$63,506	5.7
Machinery , including Electrical	28,196	7.5	146,594	19.8	174,790	15.6
All other Durable Goods	193,655	51.4	359,046	48.4	552,701	49.5
Total Durable Goods	$223,657	59.4	$567,340	76.5	$790,997	70.8
Food & Kindred Products	58,019	15.4	28,932	3.9	86,951	7.8
Textile Mill & Apparel Products	0	0	70,983	9.6	70,983	6.3
All other Nondurable Goods	94,653	25.2	74,027	10.0	168,680	15.1
Total Nondurable Goods	$152,672	40.6	$173,942	23.5	$326,614	29.2
TOTAL MANUFACTURING	$376,329	100.0	$741,282	100.0	$1,117,611	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 J

COMPARISON OF FIRST WEEK AND TOTAL
YEAR MANUFACTURING LOSSES

Losses	First Week		Year Long (Net Losses)					
	Total	Av. Per Employee[1/]	Total	Av. Per Employee[1/]	Small Establ.	Av. Per Employee[1/]	Large Establ.	Av. Per Employee[1/]
Man-Hours Lost								
SIC 20	12,937	1.0	16,393	1.3	9,336	3.0	7,057	0.8
All Others	175,036	2.0	121,068	1.4	28,910	1.6	92,158	1.3
TOTAL MFG.	187,973	1.8	137,461	1.4	38,246	1.8	99,215	1.2
Wages Lost								
SIC 20	$71,904	$5.80	$86,951	$7.00	$58,019	$18.40	$28,932	$3.10
All Others	$1,443,604	$16.20	$1,030,792	$11.50	$318,310	$17.70	$712,350	$10.00
TOTAL MFG.	$1,515,509	$14.90	$1,117,743	$11.00	$376,329	$17.80	$741,282	$9.20
Value of Production Lost								
SIC 20	$143,691	$11.50	$641,589	$51.50	$589,839	$186.70	$51,750	$5.60
All Others	$7,529,129	$84.30	$6,711,696	$75.20	$2,741,259	$152.70	$3,970,437	$55.70
TOTAL MFG.	$7,672,820	$75.40	$7,353,285	$72.30	$3,331,098	$157.80	$4,022,187	$49.90
Number of Establishments	1,141		1,141		935		206	
Average Value of Production Lost Per Establishment	$6,725		$6,445		$3,563		$19,525	

[1/] Total lost man-hours, wages, and value of production in universe divided by appropriate 1978 employment.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

small establishments in this "all others" group, and even larger than the losses in food (SIC 20). But limitations in the sampling as well as the nature of the data extrapolation process inhibit the presentation of these two-digit industry losses for small establishments as precise information.

2.2.6 Comparison of Immediate and Short-Term Losses

Table 2J also compares the reported TMI related losses for the immediate impact period (March 30, 1979 to April 6, 1979) with those reported for the full year, March, 1979 to March, 1980. These two sets of figures are not additive -- the year-long loss figures include the immediate period losses as reduced or increased in subsequent months. As Table 2J reveals, some TMI-related lost wages, man-hours and value of production were recouped during the last three-quarters of 1979 and the first quarter of 1980. Consequently, for manufacturing as a whole, it would appear that the losses were concentrated in the first week.

In the food processing industry (SIC 20), however, losses continued to mount beyond the immediate period. For example, value of production losses for SIC 20 were more than three times greater in the year-long period than they were during the first week. Man-hour and wage losses also increased during the subsequent months in sharp contrast to the non-food SIC's. For these non-food establishments, about 30 percent of the initial wage and man-hour losses were recaptured in the subsequent months. And about 11 percent of the value of production losses were also recaptured.

2.2.7 Negative Fiscal Impacts Mostly Short-Lived

For almost 60 percent of all the manufacturing firms negatively affected in the area of study (245 establishments), the fiscal impacts were over in the immediate period following the accident. By the time the Governor's evacuation advisory was lifted, fiscal losses were no longer being sustained by 75 percent of the durable goods and 46 percent of the non-durable goods establishments. (See Table 2K.)

Only 11 percent of the durable goods firms indicated that fiscal losses lasted throughout the 12 month period. The majority of the non-durables, on the other hand, appeared to continue to sustain fiscal losses beyond the immediate period; for them, the negative fiscal effects continued through June, 1979. By the end of the year-long period, however, only three percent of the non-durables were still experiencing

Table 2 K

LENGTH OF TIME OF NEGATIVE FISCAL EFFECTS BY MANUFACTURING GROUP

Group & (Establishments with Negative Effect)	3/30/79-4/9/79		3/30/79-6/30/79		3/30/79-9/30/79		3/30/79-12/31/79		3/30/79-3/28/80		No Period Specified	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Primary & Fabricated Metals (28)	26	92.8	1	3.6	0	0	0	0	0	0	1	3.6
Machinery, including Electrical (38)	28	73.7	0	0	0	0	0	0	0	0	10	26.3
All other Durable Goods (52)	34	65.4	0	0	0	0	0	0	13	25.0	5	9.6
Total Durable Goods (118)	88	74.6	1	0.8	0	0	0	0	13	11.0	16	13.6
Food & Kindred Products (27)	10	37.0	4	14.8	1	3.7	0	0	3	11.1	9	33.4
Textile Mill & Apparel Prod. (6)	1	16.7	3	50.0	0	0	0	0	0	0	2	33.3
All other Nondurable Goods (94)	47	50.0	13	13.8	0	0	0	0	1	1.1	33	35.1
Total Nondurable Goods (127)	58	45.7	20	15.7	1	0.8	0	0	4	3.1	44	34.7
TOTAL MANUFACTURING (245)	146	59.6	21	8.6	1	0.4	0	0	17	6.9	60	24.5

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

adverse fiscal effects. The conclusion is that year-long fiscal losses were sustained by only seven percent of the firms negatively affected by the accident.

Unfortunately, many respondents (about 25 percent) to the Department of Commerce's study were unable to identify when the fiscal effects terminated. There are probably many ways this can be interpreted; perhaps they were unable to specify just when their losses did stop, or perhaps their fiscal losses have continued even beyond the year-long period.

2.2.8 Most Firms Have Recouped Losses

After the TMI accident, 56 percent of the manufacturing establishments which had been negatively affected reported that they had recouped their fiscal losses by March, 1980. This includes 116 small establishments and 21 large ones out of the total of 245 firms claiming losses. This recoupment is shown on Table 2L, and is indicated by the information entitled "full or nearly full recovery -- 90 percent to 100 percent". The Department of Commerce's study revealed that recovery was most often achieved through longer working hours and higher productivity rather than through increased promotion of sales or reimbursement.

An equal number of durable and non-durable goods firms seem to have reached full or nearly full recovery. But only about 25 percent of the food firms have reached this degree of recovery; and the group "all other durables" has also experienced only about a 25 percent recovery. On the other hand, all of the 29 small machinery establishments have achieved recovery.

A substantial percentage of the firms experiencing losses -- 33 percent -- have had no, or nearly no, recovery (zero to ten percent recovery). Here again there is no significant difference between durable and non-durable goods firms. Furthermore, food processing establishments expressed that only 15 percent of them had no, or nearly no, recovery; and a full 33 percent (nine out of the 27 negatively affected) expressed no opinion at all, which may be indicative that they are uncertain about the degree of their recovery.

Table 2L indicates that 57 percent of the small firms have essentially recovered their losses and 51 percent of the large firms have also done so.

Recalling that about 30 percent of the wage and man-hour losses experienced by non-food processing firms had been recaptured during the past year (Section 2.2.6), and recog-

Table 2 L

EXTENT OF RECOVERY FROM TMI LOSSES

Group & (Small and Large Establishments With Negative Impactr)	Full or Nearly Full Recovery (90% - 100%)						No or Nearly No Recovery (0% - 10%)					
	Small Establ.	% of Total Mfg.	% of Group Negative Impacts	Large Establ.	% of Total Mfg.	% of Group Negative Impacts	Small Establ.	% of Total Mfg.	% of Group Negative Impacts	Large Establ.	% of Total Mfg.	% of Group Negative Impacts
Primary & Fabricated Metals (24-4)	18	15.5	75.0	2	9.5	50.0	0	0	0	0	0	0
Machinery, incl. Electrical (29-9)	29	25.0	100.0	7	33.4	77.8	0	0	0	2	14.3	22.2
All Other Durable Goods (42-10)	11	9.5	26.2	2	9.5	20.0	31	46.3	73.8	6	42.8	60.0
Total Durable Goods (95-23)	58	50.0	61.1	11	52.4	47.8	31	46.3	32.6	8	57.1	34.8
Food & Kindred Prod. (25-2)	7	6.0	28.0	0	0	0	3	4.5	12.0	1	7.1	50.0
Textile Mill & Apparel Prod. (0-6)	0	0	0	2	9.5	33.3	0	0	0	4	28.7	66.7
All Other Nondurable Goods (84-10)	51	44.0	60.7	8	38.1	80.0	33	49.2	39.3	1	7.1	10.0
Total Nondurable Goods (109-16)	58	50.0	53.2	10	47.6	62.5	36	53.7	33.0	6	42.9	37.5
TOTAL MANUFACTURING (204-41)	116	100.0	56.9	21	100.0	51.2	67	100.0	32.8	14	100.0	34.1

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

NOTE: The total 245 establishments reporting a negative effect includes the 218 shown in the table above plus 11 establishments whose range of recovery was between 10% and 90% and 16 establishments whose degree of recovery is unknown.

nizing that 56 percent of the establishments experiencing losses reported virtual recovery during the same period of time, it can be concluded that the establishments with the smaller man-hour and wage losses must have been those which expressed recovery (perhaps through working longer hours as discussed earlier). Since only about 11 percent of the value of production losses in non-food firms was recaptured, it can be concluded that most firms expressing recovery feel they have recovered mainly man-hours and wages lost and not value of production.

2.2.9 Image Effects are Small

The Department of Commerce's study in spring of 1980 inquired concerning what effect the accident had on the image of business products, merchandise or services, and what this image effect was felt to be one year later. The results are shown on Table 2M.

Over three-fourths of the manufacturing firms reported no image effects on their operations at the time of the accident. And only seven percent said there was a negative effect. (The study in May, 1979 -- soon after the accident -- had discovered that about ten percent of the manufacturing establishments noted an effect on the image of their product.)

One year later, about seven percent of the manufacturing firms still expressed that TMI was having a negative effect on their operations. This was mostly felt to be "very little effect", however (three-fourths of those feeling a negative effect). The number perceiving that TMI was having no effect increased slightly during the year (50 establishments), but this was because the number of firms which were not sure about TMI's impact on image had declined.

There are some differences in attitude concerning the negative image impact over the year between small and large establishments. There has been no improvement in attitude about the negative image impact of TMI among the small establishments. The same number said it was negative both at the time of the accident and one year later. Meanwhile, some large establishments had changed their opinion about the negative effect -- fewer of them felt it was negative one year later.

2.2.10 Total Employment Unaffected

A careful analysis of employment data provided by the Office of Employment Security, Department of Labor and Industry,

Table 2 M

TMI IMAGE EFFECT ON MANUFACTURING
AT TIME OF ACCIDENT

Type of Effect	Small Establishments No.	Small Establishments % of Total	Large Establishments No.	Large Establishments % of Total	All Establishments No.	All Establishments % of Total
Positive	0	0	2	1.0	2	0.2
Negative	69	7.4	15	7.3	84	7.4
No Effect	719	76.9	149	72.3	868	76.1
Not Sure	103	11.0	15	7.3	118	10.3
Unspecified	44	4.7	25	12.1	69	6.0
TOTAL MFG.	935	100.0	206	100.0	1,141	100.0

ONE YEAR LATER

Type of Effect	Small Establishments No.	Small Establishments % of Total	Large Establishments No.	Large Establishments % of Total	All Establishments No.	All Establishments % of Total
Negative Effect	69	7.4	9	4.4	78	6.8
Serious	(6)	(0.7)	(1)	(0.5)	(7)	(0.6)
Some	(4)	(0.4)	(6)	(2.9)	(10)	(0.9)
Very Little	(59)	(6.3)	(2)	(1.0)	(61)	(5.3)
No Effect	751	80.3	167	81.1	918	80.5
Not Sure	60	6.4	10	4.8	70	6.1
Unspecified	55	5.9	20	9.7	75	6.6
TOTAL MFG.	935	100.0	206	100.0	1,141	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

does not show any notable effect of TMI on total employment in the seven county region around TMI. Table 2N lists the month-by-month levels of total employment by the various labor market areas in the region (including Standard Metropolitan Statistical Areas). It shows the monthly employment levels and bi-monthly percentage changes as experienced since March, 1979. Data for all seven counties which are usually considered as possibly affected by the accident have been included. The data includes total employment levels for the whole one-year period since the accident -- up through April, 1980.

Table 2N indicates that during the period March through May of 1979 -- right after the accident -- the seven county area exhibited an increase of 4,800 jobs, with the largest share of these gains occurring in the Harrisburg and Lancaster SMSA's. Thus, there were employment gains in the period shortly following the accident; a time when, if TMI was to create outright employment losses, these losses would have indeed occurred. The very small dip in total employment between March and April of 1979 was not due to the TMI accident. This is a normal annual seasonal development. Table 2N indicates that this seasonal decline occurred again between March and April of 1980. The same seasonal fluctuation is also found to occur at the state level.

Total employment gains continued through July, 1979 -- four months after the TMI accident. In fact, total employment levels for all months after July, 1979 and continuing through March, 1980 have been higher than that for March, 1979. So, in spite of several fluctuations which have occurred over the 12 month period, the data indicate that overall employment levels have consistently remained higher in all months in the seven county area than that which occurred during March, 1979.

There were fluctuations which did occur during the 12 month period. There was a slight dip in total employment between March and April, 1979 as noted above. And, after July, 1979 there was a general downturn in total employment levels in response to the slide in the national economy which had been occurring since the second quarter of 1979. Decreases in business levels and consumer spending brought about by rising rates of inflation and resulting higher prices, as well as high interest rates and threats of recession, all began to take their toll on employment. Yet, a slight gain in total employment did occur in November in response to the approach of the Christmas season. This was then followed by a mid-winter decline in January, 1980 and then a small rebound in February and March with the approach of spring levels of activity.

Table 2 N

TRENDS IN TOTAL EMPLOYMENT
MARCH, 1979 - APRIL, 1980

Time Period	Harrisburg SMSA[1/]	Lancaster SMSA[2/]	York SMSA[3/]	Lebanon LMA[4/]	Total 7-County Area
March, 1979	203,400	165,300	161,400	45,500	575,600
April, 1979	203,500	165,900	160,800	45,200	575,400
May, 1979	205,900	166,900	162,000	45,600	580,400
March-May % Change	+1.2	+1.0	+0.4	+0.2	+0.8
June, 1979	207,200	168,600	162,200	46,100	584,100
July, 1979	213,300	170,700	164,200	46,900	595,100
March-July % Change	+4.9	+3.3	+1.7	+3.1	+3.4
August, 1979	210,300	169,200	162,800	46,200	588,500
September, 1979	205,900	167,700	162,900	45,600	582,100
March-Sept. % Change	+1.2	+1.4	+0.9	+0.2	+1.1
October, 1979	204,600	167,200	163,100	45,300	580,200
November, 1979	206,900	169,400	165,100	46,200	587,600
March-Nov. % Change	+1.7	+2.5	+2.3	+1.5	+2.1
December, 1979	205,900	168,900	164,700	45,800	585,300
January, 1980	204,700	167,400	162,600	45,600	580,300
March-Jan. % Change	+0.6	+1.3	+0.7	+0.2	+0.8
February, 1980	204,800	168,500	162,300	45,800	581,400
March, 1980	208,100	168,000	162,200	45,900	584,200
March-March % Change	+2.3	+1.6	+0.5	+0.9	+1.5
April, 1980*	208,700	167,800	161,200	46,000	583,700

*Preliminary

1/ Dauphin, Cumberland and Perry Counties

2/ Lancaster County

3/ York and Adams Counties

4/ Lebanon County

SOURCE: Office of Employment Security, Pennsylvania Department of Labor and Industry.

Table 20 shows the corresponding unemployment data for the seven county area over the past 12 month period. It indicates that levels of unemployment were almost consistently below those of March, 1979 during each month from April through September of 1979 -- the six month period following the accident. Some increase in unemployment occurred during June, but this reflected the usual seasonal entry of students into the labor market, amplifying the total number of unemployed during that period.

Unemployment rose in October, probably in response to the cumulative effects of several months of negative developments in the national economy. It dropped dramatically in November and December with the onset of the Christmas season. Calendar year 1980 has seen unemployment climb to levels significantly above those of March, 1979; this has not been due to TMI, but rather to the advent of recessionary conditions in the national and state economies.

2.2.11 Manufacturing Employment Not Impacted

Of more interest are the trends which have occurred specifically in manufacturing employment, and the series of tables which follow show that employment in manufacturing in the seven county area has not been notably impacted by TMI, but has followed the usual seasonal patterns of change.

Table 2P shows the monthly percentage change in manufacturing employment for 1978, 1979 and into early 1980. Of primary importance is the fact that there was an increase in manufacturing employment from March to April, 1979 -- right after the accident. There was a gain of 0.7 percent in this period. It is apparent that the gain in 1979 was not as great as in 1978, but most of 1979 was not as good a year economically as the previous year. The smaller increase in April following the accident was a result of the general economic situation rather than any relationship to TMI.

It can be seen from Table 2P that the monthly percent changes following the March/April period closely resemble the normal seasonal trends of 1978 prior to the accident, with the exception of the June/July change. It will be shown on a subsequent table that the June/July period of 1979 was also a period of employment loss in the manufacturing sector both in Pennsylvania and the United States, and is therefore unrelated to TMI. The slight decline in manufacturing employment from April to May of 1979 was also a seasonal development -- notice that it occurred in 1978 as well.

Table 20

TRENDS IN UNEMPLOYMENT
MARCH, 1979-APRIL, 1980

Time Period	Harrisburg SMSA[1/]	Lancaster SMSA[2/]	York SMSA[3/]	Lebanon LMA[4/]	Total 7-County Area
March, 1979	12,200	8,700	9,000	2,700	32,600
April, 1979	9,100	6,900	6,600	2,100	24,700
May, 1979	8,700	6,400	7,200	2,000	24,300
March-May % Change	-28.7	-26.4	-20.0	-25.9	-25.5
June, 1979	12,00	9,100	9,900	3,000	34,100
July, 1979	9,800	7,300	10,300	3,500	30,900
March-July % Change	-19.7	-16.1	+14.4	+29.6	- 5.2
August, 1979	11,100	8,400	9,000	3,100	31,600
September, 1979	11,000	8,500	8,200	3,000	30,700
March-Sept. % Change	- 9.8	- 2.3	- 8.9	+11.1	- 5.8
October, 1979	12,900	9,700	10,600	3,900	37,100
November, 1979	10,900	8,200	9,000	3,600	31,700
March-Nov. % Change	-10.7	- 5.8	0	+33.3	- 2.8
December, 1979	10,000	7,400	8,600	2,900	28,900
January, 1980	13,100	9,000	12,200	3,600	37,900
March-Jan. % Change	+ 7.4	+ 3.5	+35.6	+33.3	+16.3
February, 1980	12,900	9,700	12,100	3,300	38,000
March, 1980	12,600	8,800	11,300	2,900	35,600
March-March % Change	+ 3.3	+ 1.2	+25.6	+7.4	+ 9.2
April, 1980*	11,900	8,600	10,600	3,000	34,100

*Preliminary

1/ Dauphin, Cumberland and Perry Counties

2/ Lancaster County

3/ York and Adams Counties

4/ Lebanon County

SOURCE: Office of Employment Security, Pennsylvania Department of Labor and Industry.

Table 2 P

MONTHLY PERCENT CHANGE IN MANUFACTURING EMPLOYMENT
SEVEN COUNTY TMI AREA[1/]
1978, 1979, AND PART OF 1980

Year and Sector	Dec./ Jan.	Jan./ Feb.	Feb./ Mar.	Mar./ Apr.	Apr./ May	May/ June	June/ July	July/ Aug.	Aug./ Sept.	Sept./ Oct.	Oct./ Nov.	Nov./ Dec.
1978												
TOTAL ALL MANUFACTURING	-	+1.7	-0.9	+2.4	-0.6	+1.5	+0.4	+1.2	-0.1	+0.8	-0.8	+0.1
Durable Goods	-	+2.3	-1.4	+3.4	-0.4	+1.4	+0.2	+1.5	-0.4	+1.1	-0.9	+0.6
Nondurable Goods	-	+0.5	-0.1	+1.1	-0.8	+1.6	+0.8	+0.8	+0.3	+0.6	-0.6	-0.6
1979												
TOTAL ALL MANUFACTURING	+0.5	-0.4	-0.6	+0.7	-0.7	+1.7	-0.5	+1.0	-1.0	+0.6	-0.1	-0.1
Durable Goods	+1.6	-1.2	-0.2	+0.8	-0.1	+2.8	-0.1	+0.6	-1.3	+0.7	-1.7	+0.1
Nondurable Goods	-1.0	+0.8	-1.2	+0.5	-1.4	+0.3	-1.0	+1.6	-0.7	+0.4	+2.2	-0.3
1980												
TOTAL ALL MANUFACTURING	+1.3	-1.1	-0.1	-0.6[P]								
Durable Goods	+2.8	-1.0	-0.1	-0.9[P]								
Nondurable Goods	-0.9	-1.3	0	-0.3[P]								

[1/] Includes the seven counties within the Harrisburg, York, Lancaster, and Lebanon Labor Market Areas - Dauphin, Cumberland, Perry, York, Adams, Lancaster, and Lebanon. Percentages derived from employment data not seasonally adjusted.

P = Data preliminary for April, 1980

SOURCE: Pennsylvania Department of Labor and Industry, Office of Employment Security.

There was a general worsening in the seven county area manufacturing economy after late summer of 1979. A trend of relative stagnation for the balance of 1979 was followed by periods of decline, especially since February of 1980. This slump is particularly evident when 1980 data is compared to that for 1978.

Table 2Q indicates the trends of employment in the various aggregated categories of the manufacturing sector. Following the accident in March, 1979 the food and kindred products industry had increased employment in April. This percentage gain in food was larger than that experienced by any of the other components. Then there was a decline from April to May, 1979 in the majority of the component industries, with food being the most significant. Furthermore, the April to May drop of 1979 was also evident in 1978 data, as indicated before in Table 2P, and hence indicates a seasonal trend. After May, 1979 the data shows that the food and kindred products industry experienced relatively uniform monthly increases in employment throughout the rest of the year.

Manufacturing in the seven county TMI area comprises an important share of the Commonwealth's manufacturing employment -- over 13 percent of all manufacturing jobs in the state. This share has not diminished as a result of the accident.

Prior to March, 1979 the area accounted for 13.3 percent of the Commonwealth's manufacturing employment. During the following 12 month period, the seven county area increased its share of state manufacturing jobs. By March, 1980 the area represented 13.5 percent of the Commonwealth's manufacturing employment -- larger than before the accident. The gains in total manufacturing employment in the area as a share of the Commonwealth are shown in Table 2R.

When the month-by-month percentage changes in manufacturing employment for the seven county area are compared to those for Pennsylvania and the United States (Table 2S), it can be seen that the monthly and seasonal fluctuations during 1979 were almost identical to those of 1978. It appears that whatever factors have been causing the state and national trends have also been influencing employment in the seven county area. The TMI accident has not had a "pattern breaking effect" on the employment swings in the area.

The table also indicates that the gains of 1979 were not as great as in 1978 -- none of the three areas were as healthy in 1979 -- particularly in the latter part of the year. Furthermore, there was a gain in employment from March to

Table 2 Q

MONTHLY PERCENT CHANGE IN MANUFACTURING EMPLOYMENT BY GROUPS
SEVEN COUNTY TMI AREA 1/
JANUARY, 1979-APRIL, 1980

	1979											1980			
	Jan./ Feb.	Feb./ Mar.	Mar./ Apr.	Apr./ May	May/ June	June/ July	July/ Aug.	Aug./ Sept.	Sept./ Oct.	Oct./ Nov.	Nov./ Dec.	Dec./ Jan.	Jan./ Feb.	Feb./ Mar.	Mar./ Apr. P
Durable Goods															
· Primary & Fabricated metals industries	-0.6	+0.3	+1.6	-1.3	+1.9	0	-0.3	+0.6	+0.6	+0.9	+0.6	-0.3	-2.5	+0.3	-2.2
· Machinery industries	0	+1.2	0	+0.5	+1.9	0	+0.9	-1.4	+0.5	-6.6	+1.2	+8.4	-0.4	-0.4	+0.2
· Other durable goods	-3.4	-2.5	+1.6	-0.3	+4.8	-0.3	+1.2	+3.0	+1.3	+2.5	-1.8	-0.9	-0.3	0	-1.2
Nondurable Goods															
· Food & Kindred Products	+2.5	-4.8	+2.0	-3.5	+1.0	+4.1	+3.9	0	+2.4	+2.8	+0.9	-3.1	-4.1	-0.5	0
· Textile & apparel industries	+1.4	-0.4	+0.9	-1.3	-0.9	-3.2	-1.4	+0.5	0	+0.5	-1.4	+0.5	+0.5	-0.9	0
· Leather industries	+1.3	-3.7	-1.3	-2.6	+1.3	-7.9	+5.7	-4.1	-2.8	+11.6	0	0	-1.3	0	-1.5
· Other non-durable goods	-1.1	+1.9	0	+0.4	0	-1.1	-1.1	-1.1	0	+0.8	-0.4	-0.4	-0.4	+1.1	-1.5

1/ Includes the seven counties within the Harrisburg, York, Lancaster, and Lebanon Labor Market Areas. Dauphin, Cumberland, Perry, York, Adams, Lancaster, and Lebanon. Percentages derived from employment data not seasonally adjusted.

P = Data preliminary for April, 1980.

SOURCE: Pennsylvania Department of Labor and Industry, Office of Employment Security.

Table 2 R

TOTAL MANUFACTURING EMPLOYMENT
SEVEN COUNTY TMI AREA AS A SHARE OF THE COMMONWEALTH
JANUARY, 1979 - MARCH, 1980

	1979 % Shares	1980 % Shares
January	13.32	13.59
February	13.38	13.46
March	13.28	13.46
April	13.37	
May	13.25	
June	13.29	
July	13.35	
August	13.55	
September	13.33	
October	13.35	
November	13.48	
December	13.33	

SOURCE: Pennsylvania Department of Labor and Industry, Office of Employment Security.

Table 2 S

MONTHLY PERCENT CHANGE IN TOTAL MANUFACTURING EMPLOYMENT
U.S., PA, AND SEVEN CO. TMI AREA
1978, 1979, AND PART OF 1980

Year and Area	Dec/ Jan	Jan/ Feb	Feb/ Mar	Mar/ Apr	Apr/ May	May/ June	June/ July	July/ Aug	Aug/ Sept	Sept/ Oct	Oct/ Nov	Nov/ Dec
1978												
United States	-	+0.1	+0.7	+0.5	+0.5	+1.4	-1.2	+1.1	+1.8	+0.1	+0.3	-0.01
Pennsylvania	-	-0.1	+0.6	+0.9	+0.3	+1.2	-0.7	+0.6	+0.04	-0.3	+0.2	-0.3
7 County TMI Area	-	+1.7	-0.9	+2.4	-0.6	+1.5	+0.4	+1.2	-0.1	+0.8	-0.8	+0.1
1979												
United States	-0.7	+0.1	+0.5	-0.7	+0.4	+1.2	-0.5	+0.1	+0.9	-0.5	-0.6	-0.3
Pennsylvania	+0.3	-0.8	+0.1	-0.01	+0.2	+1.4	-0.9	-0.5	+0.6	-0.3	-0.3	+1.1
7 County TMI Area	+0.5	-0.4	-0.6	+0.7	-0.7	+1.7	-0.5	+1.0	-1.0	+0.6	-0.1	-0.1
1980												
United States	-0.1	-0.3	+0.1	NA								
Pennsylvania	-0.7	-0.2	-0.1	NA								
7 County TMI Area	+1.3	-1.1	-0.1	-0.6[P]								

NA = Not Available

P = Data preliminary for April, 1980.

SOURCE: Pennsylvania Dept. of Labor and Industry, Office of Employment Security.

April, 1979 in the seven county area right after the accident, while there were declines in the state and nation. And while there was a percentage decline in the April to May period in the TMI area, this decline also occurred during the same period in 1978.

2.2.12 Non-TMI Factors Affect Local Economy

The Department of Commerce's data collection effort of April and May, 1980 also determined what factors other than TMI were at work in the local, regional and national economy during 1979 which affected the performance of the respondents' businesses. The results are presented in Table 2T. The numbers shown reflect the occasions that each particular factor was noted. Obviously, many establishments noted more than one factor.

The most frequently mentioned factor was increased energy costs. This factor affected the food and kindred products industry to about the same degree as the non-food SIC's. The second most important factor was increased costs of raw materials and supplies -- this was a problem more affecting the non-food establishments. The third most frequently mentioned item was high interest rates, and the fourth mentioned -- gasoline shortage -- was much more of a problem to the food industry.

Table 2U shows that these negative economic developments during 1979 were listed in the same frequency by both small and large firms -- that is, they both ranked these factors in about the same order of importance. Of interest, the gasoline shortage was more of a negative factor to small firms, whereas decline in consumer spending was a more important problem to large establishments.

Table 2 T

OTHER FACTORS HAVING NEGATIVE EFFECT ON
MANUFACTURING SECTOR ESTABLISHMENTS
DURING 1979

Factors	All SIC's	% of Total	Food SIC 20	% of Total	Non Food SIC's	% of Total
Increased Energy Costs	702	32.0	120	30.9	582	32.3
Increased Costs: Raw Materials/ Supplies	604	27.6	97	25.0	507	28.2
High Interest Rates on Borrowed Capital	454	20.7	71	18.3	383	21.3
Gasoline Shortage	166	7.6	59	15.2	107	5.9
Decline in Consumer Spending	159	7.3	34	8.8	125	6.9
Loss of Market	52	2.4	4	1.0	48	2.7
Labor Disputes	52	2.4	3	0.8	49	2.7
TOTAL FREQUENCY	2,189	100.0	388	100.0	1,801	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 U

NUMBER AND RANKING OF NEGATIVE FACTORS BY ESTABLISHMENT SIZE

Factors	Small Firms		Large Firms	
	Number	Rank	Number	Rank
Increased Energy Costs	545	1	157	1
Increased Cost: Raw Materials/Supplies	463	2	141	2
High Interest Rates on Borrowed Capital	356	3	98	3
Gasoline Shortage	132	4	34	5
Decline in Consumer Spending	110	5	49	4
Loss of Market	37	7	15	6
Labor Disputes	44	6	8	7
TOTAL FREQUENCY	1,687		502	

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

3.0 NONMANUFACTURING

The accident had a notable and direct impact on the nonmanufacturing sector of the economy. It began immediately following the accident. Losses during the first week period (March 30 to April 6, 1979) were estimated to have been just over one million man-hours of lost work (16 percent of all nonmanufacturing employees were out of work due to TMI at some time during the first week), $5.5 million in lost wages, and over $74 million in lost value of sales and services within a six county area around the TMI plant. Many of the negative impacts continued on beyond the first week; by the time of the lifting of the Governor's evacuation advisory on April 9, 1979 about one-half of the affected entities were still experiencing some losses.

Average losses were larger in the nonmanufacturing sector than in manufacturing. Comparisons of overall average first week losses per employee in nonmanufacturing and manufacturing respectively are: lost man-hours, 4.0 hours and 1.8 hours; wages lost, $20 and $15; and lost value of sales or production, $278 and $75. Average losses per entity/establishment during the first week in value of sales or production, however, were $3,673 and $6,725 respectively, indicating that such losses were greater at each individual place of business in the case of manufacturing rather than nonmanufacturing. But then there are many more nonmanufacturing businesses than manufacturing within the TMI area.

The absolute losses were greater among the large nonmanufacturing businesses -- 52 percent of the lost man-hours, 53 percent of the lost wages, and 58 percent of the lost value of sales or services. This is the same situation as occurred in manufacturing. Also similar to manufacturing, the average losses per employee were much larger among smaller nonmanufacturing businesses, indicating that they were more severely affected by the immediate economic impacts of the accident. And the largest share of the losses occurred in the retail trade division of nonmanufacturing. The services division was also heavily impacted.

During the immediate impact period both supply and marketing disruptions were sustained by a small portion of the nonmanufacturing sector -- five percent of the businesses experienced disruptions in supply and 12 percent had marketing disruptions. Most of these dislocations occurred among the smaller entities. This disruption pattern was remarkably similar to that experienced by the manufacturing sector.

Relatively few unemployment claims were filed due to TMI in the nonmanufacturing sector. Most of them were placed during the month of April, 1979, except for those filed for a longer period of time by construction workers who were involved in maintenance jobs at the TMI plant.

Information concerning the whole year span of time after the accident -- March 30, 1979 to March 28, 1980 -- indicate that the relative share of nonmanufacturing entities affected by the accident was small. Only 28 percent of the over 20,000 entities in the area of study experienced negative effects. This percentage is a bit larger than the share of manufacturing establishments negatively affected (20 percent). Yet both sectors had the same share -- two-thirds -- which indicated that TMI had no fiscal effect at all on their business. By far the greatest share of all entities experiencing negative fiscal impacts during the past year were in the retail trade and services divisions. And overall, it was the small nonmanufacturing firms which had the greater average losses per employee.

About 50 percent of the entities sustaining losses during the year incurred those losses only during the immediate period after the accident, as mentioned previously. But by the end of June, 1979, 70 percent of the impacted entities were feeling no continuing effects. This is about the same percentage which had fiscal losses terminate by the end of June in the manufacturing sector. Most of the remaining entities saw their period of losses terminate by the end of December, 1979. Overall, just four percent of the impacted nonmanufacturing firms experienced losses throughout the entire year-long period. This compares to manufacturing, where seven percent of the impacted establishments sustained year-long losses.

Some of the losses of the immediate period were recouped during the remaining months of 1979 and the first quarter of 1980. This is particularly true in the case of lost man-hours -- each of six nonmanufacturing divisions (all except agriculture) claimed less net man-hours lost during the entire year than during the immediate period. Overall, 27 percent of the lost man-hours were recovered, with the extent of recoupment varying from division to division.

In addition, some of the losses in wages and value of sales or services were recouped during the year. This was true of the construction, transportation and public utilities, wholesale trade, and finance, insurance and real estate divisions. But both the retail trade and services divisions reported larger net losses during the year than those which were incurred during the immediate period, indicating a general lack of recovery in these two areas.

Overall, only 16 percent of the nonmanufacturing entities which had been negatively affected by the accident had essentially recouped their losses by March, 1980. This compares unfavorably with the 56 percent of the manufacturing establishments which had virtually recovered (90 percent or more) their losses by that time. An additional 13 percent of the nonmanufacturing businesses did experience some degree of recovery -- between ten and 90 percent. The methods of recovering losses were mainly the promotion of sales and the application of longer working hours.

On the other hand, 52 percent of all the entities experiencing negative fiscal effects at some time during the year had no or virtually no recoupment of losses. This is a much higher percentage with no recoupment than occurred in manufacturing, where about 33 percent of the affected establishments had no recovery. The divisions having the greatest share of entities with no recovery are retail trade, services, and wholesale trade.

The impact of the TMI accident on the image of the nonmanufacturers' merchandise and services has been small. Less than nine percent of all the nonmanufacturers indicated that TMI created a negative image problem for them at the time of the accident. And by March, 1980 around ten percent still expressed the opinion that TMI was having a negative image effect. This percentage of firms indicating a negative image effect is slightly higher than for manufacturing (seven percent). In both cases, it appears that the perception of a negative "image effect" has neither worsened nor improved significantly.

At the time of the accident the Governor requested the Small Business Administration to declare an economic disaster area in southcentral Pennsylvania in order to secure assistance for those sustaining losses. As a result, a five county area was designated by SBA to receive economic injury assistance in the form of SBA loans for economic injuries suffered because of the TMI accident. The SBA accepted applications for such loans through January, 1980. As of May 30, 1980 a total of 22 loans had been approved amounting to over $528,000. The majority of the approved loans were for establishments of a retail nature.

Study of trends in nonmanufacturing employment over the year since the accident does not reveal any discernible negative effect due to TMI. This is the same finding as in manufacturing. The gradual increase in new nonmanufacturing jobs over the ensuing 12 months was not interrupted by the effects of the accident. There did occur seasonal fluctuations, of course, but in general, the TMI area has mirrored the performance of the United States and Pennsylvania as a whole. Some slippage in the nonmanufacturing economy did take place

during 1979, but this has been reflective of factors other than TMI which occurred since the accident, such as increased costs of energy, and materials and supplies, as well as declines in consumer spending and the advent of higher interest rates, and the gasoline shortage.

Nonmanufacturing industries are an extremely important segment of the southcentral Pennsylvania economy. Nonmanufacturing employs more workers than the manufacturing sector; for example, over twice as many workers are employed in the nonmanufacturing sector as in manufacturing within the TMI impact area.

The impacts of TMI on the nonmanufacturing economy were analyzed for six counties surrounding Three Mile Island. An explanation concerning the selection of this study area is contained in Appendix C. In the six county area there are 20,197 nonmanufacturing entities which employed 267,032 persons in 1978. An entity is defined as the total county business operation for a company in that county regardless of the number of establishments. The total employment in all establishments is represented by the 267,032 employment figure.

The leading segments of nonmanufacturing are services and retail trade -- combined, they account for 63 percent of all entities in the six county area and 62 percent of the total employment.

The impacts of the TMI-2 accident on nonmanufacturing are addressed in the following section which is divided into two parts: first, the immediate impacts which occurred during the first week following the accident (March 30, 1979 through April 6, 1979) are examined; the second part addresses the effects over a full one-year period (March, 1979 through March, 1980).

The data presented in the second part was derived primarily from a large data collection effort undertaken by the Pennsylvania Department of Commerce in the spring of 1980. A discussion of the sampling procedure and size utilized in this effort can be found in Appendix C. Information related to the immediate impact period was obtained through an earlier data collection effort conducted in September, 1979.

3.1 Immediate Impacts

The period for which immediate impacts of TMI were sought by the Department of Commerce extended from March 30 through April 6, 1979. This includes the time during which the Governor issued his advisories with respect to voluntary evacua-

tion and other matters related to the incident, such as the closing of schools within the five mile radius. It extended almost to the time when the advisories were lifted on April 9, 1979. The immediate impacts are, therefore, generally synonymous with the height of the accident during the first week.

3.1.1 All Nonmanufacturing Firms

The TMI-2 accident had an immediate impact on the nonmanufacturing economy during the first week period. Man-hours worked, wages, and value of sales or services were each adversely affected. These first week losses are described in the following paragraphs. It should be pointed out that more than one-half of the nonmanufacturing entities affected had losses extending beyond the immediate period.

The largest amounts of immediate period TMI losses were experienced by the larger entities -- 52 percent of the lost man-hours, 53 percent of the lost wages, and 58 percent of the lost value of sales or services. Large entities in nonmanufacturing consist of those having over 20 employees.

3.1.2 Man-Hours Lost

The immediate impacts of the TMI incident can be seen by examining the estimated number of man-hours lost by the various eight divisions of nonmanufacturing. Man-hours lost during the March 30 to April 6, 1979 period are shown in Table 3A. There were a total of 1,064,841 estimated man-hours lost by all nonmanufacturing entities; this represents an average loss of 4.0 hours per employee based upon the total nonmanufacturing employment in the six county area. However, there was a distinct difference in the amount of losses depending on the size of the entity -- for example, small entities with less than 20 employees lost an average of 6.6 hours per employee while entities employing more than 20 persons lost an average of only 2.9 man-hours. Like manufacturing, it appears that the small firms bore the greater share of the man-hour losses, with some sectors feeling more pronounced losses per employee than others, such as transportation and public utilities, and services. This tendency toward small firms having the larger man-hour losses could be linked to the decisions to let persons off work being made locally. For the larger firms, such decisions may have been made at more distant locations.

Table 3 A

MAN-HOURS LOST
MARCH 30, 1979 TO APRIL 6, 1979

Division	Total	Average per Employee[1/]	Entities with less than 20 Employees	Average per Employee[1/]	Entities with more than 20 Employees	Average per Employee
Agriculture, etc.	1,935	0.7	755	0.6	1,180	0.7
Mining	0	0	0	0	0	0
Construction	132,438	5.6	71,073	6.2	61,365	5.0
Trans. & Public Utilities[2/]	84,479	3.1	35,428	10.5	49,051	2.1
Wholesale Trade	70,069	2.8	31,573	4.0	38,496	2.2
Retail Trade	345,060	3.8	156,221	5.9	188,839	2.9
Finance, etc.	71,438	3.3	28,263	6.0	43,175	2.6
Services	359,422	4.9	191,865	8.2	167,557	3.4
TOTAL NONMFG.	1,064,841	4.0	515,178	6.6	549,663	2.9

1/ Total man-hours lost in universe divided by the December, 1978 employemnt.

2/ Does not include data for Metropolitan Edison which is a unique case.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

3.1.3 Employees Out of Work

Another way of examining the immediate effects of the incident is to look at the data concerning the number of employees actually out of work at some time during the March 30 to April 6, 1979 (first week) period. Table 3B, which follows, shows that the nonmanufacturing sector experienced an estimated 42,700 persons out of work due to TMI during the first week. This represents 16 percent of the total number of nonmanufacturing employees in the six county area. The data indicates that smaller entities had 25 percent of their employees out for at least some period of time. It is striking that over 90 percent of all the employees in the transportation and public utilities sector were out of work in the smaller entities having less than 20 employees. Local transit, school busing and warehousing were all affected during the height of the immediate period.

3.1.4 Wages Lost

The man-hour losses resulted in some lost wages. An estimated $5.5 million was lost during the immediate period of the incident (see Table 3C). This averaged out to over $20 per employee for all entities irrespective of size. The employees in smaller firms (less than 20 employees) sustained an estimated loss of around $33 per employee, while those in larger entities averaged about $16. There were significant differences among sectors -- transportation and public utilities employees in smaller entities experienced an average wage loss of over $100, while employees in similar small wholesale trade entities lost only around $12 per employee. One sector where size of entity was relatively unimportant was the construction industry, where average wage losses per employee were about the same in both small and large entities.

3.1.5 Losses in Value of Sales/Services

The estimated total value of business losses during the immediate period of the TMI incident was just over $74 million for the nonmanufacturing sector in the six county area. The average loss per entity was $3,673. The value of business lost during the first week is shown in Table 3D.

Overall, the largest losses were experienced by the retail trade; wholesale trade; and the finance, insurance and real estate divisions. Over 85 percent of the lost business occurred in these three divisions; and retail trade alone accounted for 53 percent of the total loss.

Table 3 B

EMPLOYEES OUT OF WORK
MARCH 30, 1979 TO APRIL 6, 1979

Division	Employees in Entities by Employment Size				
	Total	0-19	20-99	100-249	250+
Agriculture, etc.	248	97	107	44	0
Mining	0	0	0	0	0
Construction	4,069	2,380	1,495	194	0
Trans. & Pub. Util.	4,811	3,058	573	425	755
Wholesale Trade	2,832	782	604	732	714
Retail Trade	12,623	4,440	5,403	1,979	801
Finance, etc.	2,770	808	633	91	1,238
Services	15,333	7,930	3,308	1,405	2,690
TOTAL NONMFG.	42,686	19,495	12,123	4,870	6,198
	Percent of employees[1/]				
Agriculture, etc.	8.6	8.6	8.6	8.6	0
Mining	0	0	0	0	0
Construction	17.1	20.6	17.2	6.7	0
Trans. & Pub. Util.	17.9	90.6	8.9	7.4	6.7
Wholesale Trade	11.1	10.0	5.8	17.3	24.2
Retail Trade	13.8	16.8	16.5	14.2	4.3
Finance, etc.	12.8	17.0	12.8	2.1	16.2
Services	20.9	33.9	17.5	12.9	13.5
TOTAL NONMFG.	16.0	24.8	14.5	11.4	10.1

1/ Percent of all employees by division in the six county TMI area as of December, 1978.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 C

WAGES LOST
MARCH 30, 1979 TO APRIL6, 1979

Division	Total	Average per Employee[1/]	Entities with less than 20 Employees	Average per Employee[1/]	Entities with more than 20 Employees	Average per Employee[1/]
Agriculture, etc.	$9,644	$3.30	$3,761	$3.30	$5,883	$3.30
Mining	0	0	0	0	0	0
Construction	1,031,581	43.30	525,393	45.40	506,188	41.40
Trans. & Public Utilities[2/]	661,827	24.70	347,425	103.00	314,402	13.40
Wholesale Trade	232,630	9.10	95,795	12.30	136,835	7.80
Retail Trade	1,943,310	21.20	702,302	26.50	1,241,308	19.00
Finance, etc.	243,811	11.30	117,090	24.70	126,721	7.50
Services	1,351,525	18.50	762,216	32.60	589,309	11.80
TOTAL NONMFG.	$5,474,328	$20.50	$2,553,982	$32.90	$2,920,346	$15.50

[1/] Total wages lost in universe divided by December 1978 employment.

[2/] Does not include data for Metropolitan Edison which is a unique case.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 D

VALUE OF SALES/SERVICES LOST
MARCH 30, 1979 TO APRIL 6, 1979

Division	Total (000's)	Average per Entity[1/]	Less than 20 Employees (000's)	Average per Entity[1/]	More than 20 Employees (000's)	Average per Entity[1/]
Agriculture, etc.	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Mining	0	0	0	0	0	0
Construction	2,815	879	1,096	373	1,718	6,635
Trans. & Public Utilities[2/]	1,213	1,449	0	0	1,213	5,720
Wholesale Trade	11,050	6,889	4,941	3,783	6,109	20,499
Retail Trade	39,115	6,352	19,767	3,814	19,348	19,824
Finance, etc.[3/]	13,154	8,775	2,725	2,029	10,428	66,848
Services	6,842	1,043	2,846	476	3,996	6,855
TOTAL NONMFG.	$74,188	$3,673	$31,376	$1,776	$42,812	$16,895

1/ Total value of business lost in universe divided by December 1978 employment.

2/ The transportation and public utilities division does not include data for Metropolitan Edison which is a unique case, nor for an airline with a comparatively large loss whose response arrived after estimates had been completed.

3/ One financial institution in the 20-99 employment size group reported an extraordinarily large business loss of $500,000. Although the $500,000 loss was included in the extrapolations, the remainder of the 20-99 size group was inflated by an average of the 0-19 and 100-299 employee size group instead of the 20-99 size group.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Average loss per entity was highest for finance, insurance, and real estate, followed (in order) by wholesale trade and retail trade. The largest losses were found in entities having more than 20 employees (i.e., the larger firms). This should not be surprising, since the larger firms do the greatest volume of business, even though they comprise the minority of the number of total firms. The average value of lost business in the larger firms was nine times that of the smaller firms, while total employment in these firms was only 2.4 times that of the smaller ones.

3.1.6 Supply and Marketing Disruptions

During the TMI incident, there was some disruption of nonmanufacturing entities' supply and marketing channels for products purchased or products sold. The Department of Commerce's study of the immediate impacts of TMI last year found that, at the time of the accident, five percent of the nonmanufacturing entities had disruptions in supply of products purchased and about 12 percent had disruptions in channeling products sold.

This is remarkably close to the disruption patterns experienced in the manufacturing sector. In both manufacturing and nonmanufacturing, only a relatively small share of the total establishments/entities were disrupted, and the disruption in marketing was more pronounced. In fact, the share experiencing marketing disruptions was nearly identical in both cases.

Table 3E displays the distribution of dislocation among the smaller and larger entities according to the eight nonmanufacturing divisions. It is significant that, contrary to the situation which occurred in manufacturing, it was the larger nonmanufacturing entities which experienced the greatest share of the disruptions, both in supply and in marketing. Because of the dominance of smaller firms in nonmanufacturing, it is not surprising that most of the actual number of disruptions occurred among these firms.

The basic causes for disruption at the time of the accident for nonmanufacturing were probably the same as those causing disruption in manufacturing -- i.e., during the crisis period thousands of persons evacuated the area, some retail stores (including food outlets) and service establishments closed for a period of time. Simultaneously, a Teamsters' strike occurred. The data collected by Commerce in May, 1979 concerning TMI impacts on 16 selected warehousing and distribution firms (part of the transportation and public utilities division) revealed that about one-third of the establish-

Table 3 E

NONMANUFACTURING DISLOCATION

Division	Total Entities: No. of Disrupted Entities	Total Entities: % of Division Universe	Less than 20 Employees: No. of Disrupted Entities	Less than 20 Employees: % of Division Universe	More than 20 Employees: No. of Disrupted Entities	More than 20 Employees: % of Division Universe
Disruption in Receiving Supply of Products						
Agriculture, etc.	0	0	0	0	0	0
Mining	12	46.2	5	45.5	7	46.7
Construction	13	0.4	0	0	13	5.0
Trans. & Public Utilities	38	4.5	0	0	38	17.9
Wholesale Trade	116	7.2	100	7.7	16	5.4
Retail Trade	450	7.3	266	5.1	184	18.9
Finance, etc.	13	0.9	0	0	13	8.3
Services	364	5.6	332	5.6	32	5.5
TOTAL NONMFG.	1,006	5.0	703	4.0	303	12.0
Disruption in Marketing Products						
Agriculture, etc.	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Construction	0	0	0	0	0	0
Trans. & Public Utilities	26	3.1	0	0	26	12.3
Wholesale Trade	571	35.6	502	38.4	69	23.2
Retail Trade	1,225	19.9	930	17.9	295	30.2
Finance, etc.	12	0.8	0	0	12	7.7
Services	565	8.6	498	8.3	67	11.5
TOTAL NONMFG.	2,399	11.9	1,930	10.9	469	18.5

SOURCE: Department of Commerce, Bureau of Statistics, Research and Planning.

ments experienced some form of disruption attributable to TMI in either supply or delivery of products -- and, for some of these firms, the truckers' strike was even more disruptive than TMI.

Retail trade, wholesale trade, and services entities accounted for 92 percent of those experiencing dislocations in supply and over 98 percent of the marketing disruptions. This indicates that the disruptions were linked to the decline in the number of consumers (resulting from the voluntary evacuation or consumer resistance among those who remained) as well as transportation interruptions in the flow of commodities purchased or sold, or services rendered.

3.1.7 Unemployment Claims

Data concerning nonmanufacturing unemployment claims due to the TMI accident is shown on Table 2D in section 2.1.7 of the manufacturing chapter. There were 239 initial claims and 1,032 continued claims in nonmanufacturing. In fact, almost 70 percent of all continued claims due to TMI were in nonmanufacturing, especially in the construction industry. The claims data in Table 2D is the same as that for October, 1979 (discussed in the last interim report). While most of the initial claims occurred during April, 1979 after the accident, the continued claims in the construction industry trailed on into the summer and fall of 1979. This "construction" claims data, however, applies to layoffs of workers which occurred in specialized maintenance at the plant due to delays in reactivation of Unit 1.

3.2 Short Term Impacts

This section of the report presents impacts of TMI on the nonmanufacturing sector which have taken place over the one year time span since the accident. These impacts include the nature, magnitude and length of time of fiscal effects, the degree of recovery from these fiscal effects, and image problems resulting from the accident.

In the spring of 1980 the Department of Commerce sought information from nonmanufacturing entities in the six county area surrounding the TMI plant to determine if the impacts of the accident were continuing and if the losses had been recouped throughout the last three quarters of 1979 and the first quarter of 1980. The results of this effort are detailed in the following pages.

3.2.1 Overall Fiscal Effects

Of all the nonmanufacturing entities which are located within the six county area, two-thirds reported that the TMI accident has had no fiscal impact on their businesses during the past year. (See Table 3F.) Twenty-eight percent of the entities indicated that the accident did have a negative effect on their businesses. This is a higher percentage than in manufacturing. Unlike manufacturing, a greater share of large entities experienced negative impacts than did small entities. One-third of the large nonmanufacturing entities expressed such a negative impact. It appears that the nonmanufacturing firms were more certain about the year-long fiscal effects of the accident, since only three percent of the nonmanufacturing entities were not sure about the fiscal effects, whereas 12 percent of the manufacturing establishments were not sure.

In examining those entities which declared that TMI did have a negative impact, the greatest proportion were retail trade and service entities. (See Table 3G.) Eighty percent of all the entities experiencing negative impacts during the past year were in these two divisions. And it was the large retail trade entities, the small service entities, and the small retail trade entities which had the bulk (over three-fourths) of the total negative fiscal impacts.

3.2.2 Net Losses in Value of Sales/Services

Total net dollar losses in value of sales or services for those nonmanufacturing entities negatively affected due to the TMI accident during the past year approached $74 million. (See Table 3H.) Retail trade sustained more than one-half of these dollar losses -- almost $40 million. When compared by size, the small nonmanufacturing firms experienced 64 percent of the total $74 million losses.

Large entities, therefore, experienced 36 percent of the total losses; but large entities comprise only about 13 percent of the total number of entities, so it seems that large entities suffered losses during the year out of proportion to their hare of all such firms in the six county area.

Other nonmanufacturing divisions with significant losses were large service, small finance, insurance and real estate, and small wholesale trade firms.

3.2.3 Net Man-Hour Losses

During the year-long period of time, over 776,000 total net

Table 3 F

TMI'S FISCAL IMPACTS ON NONMANUFACTURING ENTITIES
MARCH, 1979 - MARCH, 1980

Type of Effect	Small Entities		Large Entities		All Entities	
	Number	% of Total	Number	% of Total	Number	% of Total
Positive	140	0.8	49	1.9	189	0.9
Negative	4,896	27.7	831	32.8	5,727	28.4
No Effect	11,942	67.6	1,476	58.2	13,418	66.4
Not Sure	428	2.4	171	6.8	599	3.0
Unknown	257	1.5	7	0.3	264	1.3
TOTAL NONMFG.	17,663	100.0	2,534	100.0	20,197	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 G

NEGATIVE FISCAL IMPACTS ON NONMANUFACTURING DIVISIONS, BY SIZE OF ENTITY
MARCH, 1979 - MARCH, 1980

Divisions	Small Entities		Large Entities		All Entities	
	Number	% of Total	Number	% of Total	Number	% of Total
Agriculture, etc.	0	0	8	1.0	8	0.1
Mining	0	0	0	0	0	0
Construction	441	9.0	84	10.1	525	9.2
Trans. & Public Utilities	0	0	41	4.9	41	0.7
Wholesale Trade	217	4.4	44	5.3	261	4.5
Retail Trade	1,925	39.3	456	54.9	2,381	41.6
Finance, etc.	269	5.5	38	4.6	307	5.4
Services	2,044	41.8	160	19.2	2,204	38.5
TOTAL NONMFG.	4,896	100.0	831	100.0	5,727	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 H

NET VALUE OF SALES/SERVICES LOST BY NONMANUFACTURING
DIVISION AND ENTITY SIZE
MARCH, 1979 - MARCH, 1980

	Small Entities		Large Entities		All Entities	
Division	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.
Agriculture, etc.	$0	0	$0	0	$0	0
Mining	0	0	0	0	0	0
Construction	107,552	0.2	817,350	3.1	924,902	1.2
Trans. & Public Utilities	0	0	806,360	3.0	806,360	1.1
Wholesale Trade	5,326,510	11.3	1,282,024	4.9	6,608,534	9.0
Retail Trade	27,821,785	58.7	12,012,234	45.5	39,834,019	54.0
Finance, etc.	10,147,060	21.4	14,600	0.1	10,161,660	13.8
Services	3,996,703	8.4	11,445,158	43.4	15,441,861	20.9
TOTAL NONMFG.	$47,399,610	100.0	$26,377,726	100.0	$73,777,336	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

man-hours of work were lost due to the TMI accident. (See Table 3I.) The table shows that the services division led all other nonmanufacturing divisions in the amount of man-hours lost (46 percent of the total). Retail trade also experienced a significantly high number of net lost man-hours. Fifty-five percent of the losses were in the large entities, which comprise 70 percent of the six county nonmanufacturing employment. What seems to have occurred is that the small entities had an unduly large proportionate share of lost man-hours. Therefore, the number lost per employee was larger among the smaller nonmanufacturing firms.

3.2.4 Net Wages Lost

Nonmanufacturing employees in firms negatively affected in the six county area lost nearly $6.4 million in wages over the year-long period. Almost one-half of these lost wages were among employees in the services division, of which 97 percent occurred in the small service entities. (See Table 3J.) Retail trade also suffered extensive wage losses, about 34 percent of the total.

The relative distribution of the wages lost among the various divisions follows the pattern for man-hours lost. So both the net man-hours lost and the net wages lost are found mostly in the services and retail trade divisions. One interesting exception is in the construction industry; here employees had almost ten percent of the total wages lost even though they experienced only five percent of the man-hours lost. Wages lost per employee were much greater among the small entities, as was the case in lost man-hours.

3.2.5 Average Losses

The preceding paragraphs described the losses experienced by those nonmanufacturing entities which claimed that they had been negatively affected by the accident during the past year. These losses, by being converted to an average per-employee or average per-entity basis, enable comparisons to be made among divisions and size of entities. Such average loss data is shown in Table 3K.

It is apparent that the largest losses per employee in man-hours, wages, and value of sales or services occurred among the small entities. The table shows that the per-employee year-long losses in small entities were several times those experienced by large entities.

For example, overall wages lost per employee were almost five times as great in small entities as in large; however, in the

Table 3 I

NET MAN-HOURS LOST BY NONMANUFACTURING
DIVISION AND ENTITY SIZE
MARCH, 1979 - MARCH, 1980

Division	Small Entities		Large Entities		All Entities	
	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.
Agriculture, etc.	0	0	2,064	0.5	2,064	0.3
Mining	0	0	0	0	0	0
Construction	21,645	6.2	15,748	3.7	37,393	4.8
Trans. & Public Utilities	0	0	43,788	10.3	43,788	5.6
Wholesale Trade	6,800	1.9	14,239	3.3	21,039	2.7
Retail Trade	19,628	5.6	277,764	65.2	297,392	38.3
Finance, etc.	6,589	1.9	11,565	2.7	18,154	2.4
Services	295,759	84.4	60,927	14.3	356,686	45.9
TOTAL NONMFG.	350,421	100.0	426,095	100.0	776,516	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning

Table 3 J

NET WAGES LOST BY NONMANUFACTURING
DIVISION AND ENTITY SIZE
MARCH, 1979 - MARCH, 1980

Division	Small Entities		Large Entities		All Entities	
	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.	Number	% of Total Nonmfg.
Agriculture, etc.	$0	0	$10,320	0.5	$10,320	0.2
Mining	0	0	0	0	0	0
Construction	221,826	5.3	373,165	17.1	594,991	9.3
Trans. & Public Utilities	0	0	326,878	15.0	326,878	5.1
Wholesale Trade	45,332	1.1	70,678	3.3	116,010	1.8
Retail Trade	986,654	23.4	1,193,190	54.8	2,179,844	34.1
Finance, etc.	65,890	1.6	59,289	2.7	125,179	2.0
Services	2,891,481	68.6	142,733	6.6	3,034,214	47.5
TOTAL NONMFG.	$4,211,183	100.0	$2,176,253	100.0	$6,387,436	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 K

COMPARISON OF FIRST WEEK AND TOTAL YEAR NONMANUFACTURING LOSSES

Division	First Week	Av. Per Empl.[1/]	Year Long Net Losses	Net Year Long Average Losses Per Employee[1/] All Entities	Small Entities	Large Entities
Man Hours Lost						
Agriculture, etc.	1,935	0.7	2,064	0.7	0	1.2
Mining	0	0	0	0	0	0
Construction	132,438	5.6	37,393	1.6	1.9	1.3
Transportation & Public Utilities	84,479	3.1	43,788	1.6	0	1.9
Wholesale Trade	70,069	2.8	21,039	0.8	0.9	0.8
Recail Trade	345,060	3.8	297,392	3.2	0.7	4.3
Finance, etc.	71,438	3.3	18,154	0.8	1.4	0.7
Services	359,422	4.9	356,686	4.9	12.6	1.2
TOTAL NONMFG.	1,064,841	4.0	776,516	2.9	4.5	2.3
Wages Lost						
Agriculture, etc.	$9,644	$3.30	$10,320	$3.60	$0	$5.90
Mining	0	0	0	0	0	0
Construction	1,031,581	43.30	594,991	25.00	19.20	30.50
Transportation & Public Utilities	661,827	24.70	326,878	12.20	0	13.90
Wholesale Trade	232,630	9.10	116,010	4.60	5.80	4.00
Retail Trade	1,943,310	21.20	2,179,844	23.70	37.20	18.30
Finance, etc.	243,811	11.30	125,179	5.80	13.90	3.50
Services	1,351,525	18.50	3,034,214	41.50	123.50	2.90
TOTAL NONMFG.	$5,474,328	$20.50	$6,387,436	$23.90	$53.50	$11.60

Table 3 K (cont.)

COMPARISON OF FIRST WEEK AND TOTAL YEAR NONMANUFACTURING LOSSES

Division	First Week	Av. Per Empl.	Year Long Net Losses	Net Year Long Average Losses Per Employee[1/] All Entities	Small Entities	Large Entities
Value of Sales/Services Lost						
Agriculture, etc.	$0	$0	$0	$0	$0	$0
Mining	0	0	0	0	0	0
Construction	2,814,501	118.30	924,902	38.90	9.30	66.80
Transportation and Public Utilities	1,212,535	45.20	806,360	30.00	0	34.40
Wholesale Trade	11,049,933	433.90	6,608,534	259.50	681.10	72.60
Retail Trade	39,115,253	426.10	39,834,019	433.90	1,049.90	183.90
Finance, etc.	13,153,633	608.00	10,161,660	469.70	2,138.90	0.90
Services	6,842,125	93.50	15,441,861	211.00	170.70	229.90
TOTAL NONMANUFACTURING	$74,187,980	$277.80	$73,777,336	$276.30	$602.60	$140.00
Number of Entities	20,197		20,197		16,663.00(Small)	2,534.00(Large)
Average Value of Sales/Services Lost Per Entity	$3,673		$3,709		$ 2,684.00	$10,410.00

1/ Total lost man hours, wages, value of sales/services in Universe divided by appropriate 1978 employment.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

services division, wage losses in small entities were over 40 times those in large ones. Only in the construction, and transportation and public utilities divisions are the per-employee losses generally greater in the larger entities.

Losses in value of sales or services over the year-long period were estimated to be about $3,700 per entity (see Table 3K). When entity size is considered, however, it is evident that the larger entities experienced nearly four times the losses sustained by the small firms.

3.2.6 Comparison of Immediate and Short-Term Losses

Table 3K also compares the reported TMI-related losses for the first week period (March 30, 1979 to April 6, 1979) with those reported for the full year, March, 1979 to March, 1980. These two sets of figures are not additive. The year-long loss figures include the first week period losses as reduced or increased in subsequent months.

As Table 3K indicates, some of the TMI-related first week losses in wages, man-hours and value of sales/services were recouped in some of the nonmanufacturing divisions during the remainder of the year (the last three-quarters of 1979 and the first quarter of 1980). But for the nonmanufacturing sector as a whole, the only notable improvement following the first week appears to be in man-hours; first week man-hour losses declined by 27 percent over the year-long period. Little improvement was seen in value of lost sales or services -- less than one percent. Moreover, lost wages for the total nonmanufacturing sector increased beyond the first week. This is due to the fact that, even though most nonmanufacturing divisions experienced less wages lost for the entire year-long period than they had previously reported for the first week, the services, retail trade, and agriculture divisions reported additional lost wages over the year-long period. Agriculture reported increased man-hour losses as well.

There are several possible reasons why the wages lost data reflects a lack of improvement for the full year in these three divisions. For agriculture, there was apparently an expected increase in lost wages consistent with increased losses in man-hours. For retail trade and services, perhaps there were new wage contracts negotiated since the September, 1979 study which could have increased the dollar-per-hour wages considered in the respondent's estimate of losses reported at the time of the second (spring, 1980) study. In this connection, inflation could have also played a role.

In addition, it must be remembered that the TMI-related loss data is based upon respondents' estimates of losses rather than actual documented records of such losses. There could be some individual "over-estimations" of losses on the part of a few respondents among the sample which, when extrapolated to the universe, creates information which runs counter to the expected trends.

3.2.7 Fifty Percent Had Continuing Losses

By the end of the immediate period, about one-half of the nonmanufacturing entities experiencing negative fiscal impacts (5,727 entities) felt that these impacts were over. (See Table 3L.) This differs from the manufacturing sector, where 60 percent of the establishments felt the effects were through after the immediate period.

By the time the Governor's advisory was lifted on April 9, 1979, about 50 percent of the nonmanufacturing entities impacted were still experiencing some continuing fiscal effects. But by the end of June, 1979, 70 percent of the impacted entities were feeling no continuing effects. This is about the same percentage as seen in the manufacturing sector.

By March, 1980 only four percent of the impacted entities were still sustaining losses. This is somewhat better than the seven percent reporting year-long negative fiscal effects in manufacturing.

Negative fiscal effects terminated in wholesale trade after about a three-month period (although less than seven percent felt they were over after the immediate period). Nearly 30 percent of the transportation and public utilities division claimed that the effects were felt for a full year after the accident. Eight percent of the retail trade entities also had a full year effect.

It is important to point out that nonmanufacturing entities sustaining losses seemed to be very certain about when the negative effects terminated; only four percent were unable to specify a period when the effects ceased, compared to manufacturing, where 25 percent were unable to do so. But in the construction and transportation and public utilities divisions, nearly one-third were unable to specify when the effects ended.

3.2.8 Few Entities Have Recouped Losses

After the TMI accident, only 16 percent of the nonmanufacturing entities which had been negatively affected reported that

Table 3 L

DURATION OF NEGATIVE FISCAL EFFECTS

Division	Entities With Negative Effect	3/30/79-4/ 9/79		3/30/79-6/30/79		3/30/79-9/30/79		3/30/79-12/31/79		3/30/79-3/28/80		No Period Specified	
		No.	% of Div.	No.	% of Div.	No.	% of Div.	No.	% of Div.	No.	% of Div.	No.	% of Div.
Agriculture, etc.	8	0	0	8	100.0	0	0	0	0	0	0	0	0
Mining	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	525	182	34.7	0	0	147	28.0	4	0.8	14	2.7	178	33.8
Transportation & Public Utilities	41	17	41.4	0	0	0	0	0	0	12	29.3	12	29.3
Wholesale Trade	261	17	6.5	232	88.9	12	4.6	0	0	0	0	0	0
Retail Trade	2,381	1,036	43.5	261	11.0	410	17.2	460	19.3	190	8.0	24	1.0
Finance, etc.	307	155	50.5	150	48.9	0	0	0	0	0	0	2	0.6
Services	2,204	1,289	58.4	665	30.2	193	8.8	33	1.5	24	1.1	0	0
TOTAL NONMFG.	5,727	2,696	47.0	1,316	23.0	762	13.3	497	8.7	240	4.2	216	3.8

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

they had recouped their fiscal losses by March, 1980. This includes 754 small entities and 149 large ones out of the total 5,727 entities claiming fiscal losses. This recoupment is shown in Table 3M, and is indicated by the information entitled "full or nearly full recovery -- 90 to 100 percent". Whatever small recovery did occur was achieved mostly through longer working hours and sales promotion.

It appears that among those entities which have achieved full or nearly full recovery, it is the large entities in certain divisions (such as construction, transportation, wholesale trade and finance) that have experienced the greatest degree of recoupment. Among small entities, the best success in recoupment has occurred in the finance and service divisions.

While only 903 entities (16 percent) have had 90 to 100 percent recovery of their fiscal losses, an additional 13 percent have experienced some degree of recovery -- between ten and 90 percent (see Table 3M). Wholesale trade and finance have over 40 percent of their entities in this recovery range.

The most significant finding, however, is that about 52 percent of all the entities experiencing negative fiscal effects at some time during the year have had no or virtually no recoupment of losses. This compares with the 33 percent of the manufacturing establishments which had no recovery of their losses. The sectors having the greatest share of entities with no recovery are services, retail trade and wholesale trade.

This finding that a high percentage of the entities had no recovery is consistent with the earlier conclusion (Section 3.2.6) that less than one percent of the lost value of sales/services had been recovered during the year.

3.2.9 Image Effects Not a Problem

The Department of Commerce's study in the spring of 1980 inquired concerning what effect the accident had on the image of businesses, products, merchandise or services, and what this image effect was felt to be one year later. Table 3N reveals the results of this effort.

Almost 85 percent of all the nonmanufacturing entities reported that there were no image effects on their operations at the time of the accident. And less than nine percent said there was a negative effect -- slightly higher than that for manufacturing. (The Department's study of September, 1979 found that about five percent of all the nonmanufacturing entities had noted a TMI image effect on their operations. This

Table 3 M

EXTENT OF RECOVERY FROM TMI LOSSES

Division & (Small and Large Entities With Negative Impacts)	Full or Nearly Full Recovery (90%-100%)						No or Nearly No Recovery (0%-10%)					
	Small Entities	% of Total Nonmfg.	% of Div. Negative Impacts	Large Entities	% of Total Nonmfg.	% of Div. Negative Impacts	Small Entities	% of Total Nonmfg.	% of Div. Negative Impacts	Large Entities	% of Total Nonmfg.	% of Div. Negative Impacts
Agriculture (0-8)	0	0	0	0	0	0	0	0	0	0	0	0
Mining (0-0)	0	0	0	0	0	0	0	0	0	0	0	0
Construction (441-84)	0	0	0	25	16.8	29.8	0	0	0	39	9.4	46.4
Transportation & Public Utilities (0-41)	0	0	0	14	9.4	34.1	0	0	0	2	0.5	4.9
Wholesale Trade (217-44)	0	0	0	25	16.8	56.8	109	4.3	50.2	19	4.6	43.2
Retail Trade (1,925-456)	148	19.6	7.7	51	34.2	11.2	1,184	46.4	61.5	242	58.6	53.1
Finance, etc. (269-38)	134	17.8	49.8	33	22.1	86.8	0	0	0	5	1.2	13.2
Services (2,044-160)	472	62.6	23.1	1	0.7	0.6	1,258	49.3	61.5	106	25.7	66.3
TOTAL NONMFG. (4,896-831)	754	100.0	15.4	149	100.0	17.9	2,551	100.0	52.1	413	100.0	49.7

NOTE: The total 5,727 entities reporting a negative effect includes the 3,867 shown in the table above plus 727 entities whose range of recovery was between 10% and 90% and 1,133 entities whose degree of recovery is unknown.

10%-90%: The % of total entities reporting by division are Agriculture, etc. (0); Mining (0); Construction (3.8); Trans. & Public Utilities (29.3); Wholesale Trade (41.8); Retail Trade (4.7); Finance, etc (43.6) and Services (15.4). Total Nonmfg. (12.7).

Unknown: The % of total entities not reporting by division are Agriculture, etc. (100.0); Mining (0); Construction (84.0); Trans. & Public Utilities (31.7); Wholesale Trade (0); Retail Trade (27.0); Finance, etc. (0.3) and Services (1.2). Total Nonmfg. (19.8).

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 3 N

TMI IMAGE EFFECT ON NONMANUFACTURING
AT TIME OF ACCIDENT

Type of Effect	Small Entities		Large Entities		All Entities	
	Number	% of Total	Number	% of Total	Number	% of Total
Positive	140	0.8	63	2.5	203	1.0
Negative	1,495	8.5	295	11.6	1,790	8.9
No Effect	15,160	85.8	1,949	76.9	17,109	84.7
Not Sure	868	4.9	207	8.2	1,075	5.3
Unspecified	0	0	20	0.8	20	0.1
TOTAL NONMFG	17,663	100.0	2,534	100.0	20,197	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

ONE YEAR LATER

Type of Effect	Small Entities		Large Entities		All Entities	
	Number	% of Total	Number	% of Total	Number	% of Total
Negative	1,755	9.9	388	15.2	2,143	10.6
Serious	(297)	(1.7)	(16)	(0.6)	(313)	(1.5)
Some	(453)	(2.5)	(193)	(7.6)	(646)	(3.2)
Very Little	(1,005)	(5.7)	(179)	(7.0)	(1,184)	(5.9)
No Effect	14,454	81.9	1,981	78.3	16,435	81.5
Not Sure	868	4.9	165	6.5	1,033	5.1
Unspecified	586	3.3	0	0	586	2.8
TOTAL NONMFG.	17,663	100.0	2,534	100.0	20,197	100.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

tends to generally reinforce the finding that the overall negative image effect of the accident was relatively small.)

One year later (see Table 3N), just under 11 percent of the nonmanufacturing firms expressed the opinion that TMI was having a negative effect on their businesses. This could be interpreted to mean that the perception of adverse image effects of TMI has not improved over the year since the accident. But of all those who experienced a negative effect, over one-half (55 percent) felt this effect was "very little". In manufacturing, three-fourths of those who claimed a perceived negative image effect felt it to be "very little". So the negative image effect may be considered to be somewhat greater within the nonmanufacturing sector.

Within the total nonmanufacturing sector there are some noteworthy differences among the various divisions about the negative image effects of TMI. Most significantly, 45 percent of all agriculture entities regard the negative effects as a serious matter. (See Table 3O.)

Also, over seven percent of all retail trade entities view the negative image effects to be more than "very little" in scope. Overall, nearly one-half of the agriculture entities and almost 20 percent of the retail trade entities see negative image aspects resulting from TMI.

3.2.10 Small Business Administration Economic Injury Assistance Program

On April 18, 1979, Governor Dick Thornburgh requested the Small Business Administration to declare an economic disaster area in the southcentral Pennsylvania counties affected by the Three Mile Island incident. The Governor's request was made in order to ensure that area merchants, farmers and businessmen who sustained losses as a result of the incident would receive SBA loans at significantly reduced rates, as well as certain forms of economic and technical assistance.

Governor Thornburgh noted that economic hardships had been brought about by the incident and the precautionary measures it necessitated -- including the limited evacuation of pregnant women and young children and the placement of Civil Defense forces on alert status. As a result, he recognized that normal business activity had been disrupted and firms had experienced millions of dollars in losses. He believed that these businesses qualified for the economic injury assistance which SBA could provide.

As a result, the five county area consisting of Dauphin, York, Cumberland, Lebanon and Lancaster was designated for economic

Table 3 0

RANGE AND DISTRIBUTION OF NEGATIVE IMAGE EFFECTS BY
NONMANUFACTURING DIVISIONS ONE YEAR LATER

Division	Div. Universe Total Entities	Negative Effects							
		Serious	% of Div. Universe	Some	% of Div. Universe	Very Little	% of Div. Universe	Total Negative Effects	% of Div. Universe
Agriculture, etc.	314	140	44.6	0	0	8	2.5	148	47.1
Mining	26	0	0	0	0	0	0	0	0
Construction	3,201	4	0.1	10	0.3	149	4.7	163	5.1
Transportation & Public Utilities	837	12	1.4	12	1.4	0	0	24	2.8
Wholesale Trade	1,604	0	0	0	0	109	6.8	109	6.8
Retail Trade	6,158	0	0	435	7.1	689	11.2	1,124	18.3
Finance, etc.	1,499	0	0	5	0.4	20	1.3	25	1.7
Services	6,558	157	2.4	184	2.8	209	3.2	550	8.4
TOTAL NONMFG.	20,197	313	1.5	646	3.2	1,184	5.9	2,143	10.6

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

injury assistance. And in the beginning of May, 1979 the SBA established temporary offices to receive applications for loans in Harrisburg, York and Lancaster. Later in May, an office was set up in Middletown.

The SBA loans were for economic injuries suffered because of the TMI accident. Proof of the injury was required to be furnished with the loan application. Loans could be provided for the losses not recoverable through normal commercial channels, or internal resources. The SBA accepted TMI related applications until January 28, 1980. Under the program, loans up to $100,000 could be made available at an interest rate of 7 3/8 percent annually for a period of up to 30 years. The actual repayment period could be shorter and was determined by an applicant's ability to repay the loan.

As of May 30, 1980, SBA had conducted 490 interviews with potential applicants to explore eligibility. As a result, 76 applications had been accepted. (See Table 3P.) The dollar amount associated with these eligible applications was nearly $4.0 million. Most applications eventually approved were from retail stores and automobile dealers. As of May 30, 1980, 22 applications had been approved for loans amounting to $528,000, and 41 applications had been declined by SBA. Seven applications were still being processed by the end of May. Six applications had been withdrawn.

Because of the nature of the SBA program and its eligibility requirements for borrowing money, those firms which had experienced financial trouble prior to the TMI incident were rejected because they could not establish that their problem was due to TMI alone. Also, establishments which could easily obtain credit through normal commercial financial channels or which could absorb losses with their existing resources were not reflected in the figures above, because they would be ineligible.

Many members of the business community did not apply to the federal government for help. Most of the interest in the SBA program was shown in May and June of 1979.

3.2.11 Nonmanufacturing Employment Not Impacted

Nonmanufacturing employment levels in the TMI area for the years 1978, 1979, and the first four months of 1980 do not reveal any discernible negative impact due to the Three Mile Island accident. Over this two and one-quarter year period, nonmanufacturing employment gradually expanded in the seven county area surrounding the plant. TMI did not interrupt this progression; in fact, in the full 12 month period following

Table 3 P

SMALL BUSINESS ADMINISTRATION ECONOMIC INJURY LOAN PROGRAM STATISTICS AS OF MAY 30, 1980

Number of interviews	490
Number of loan applications accepted	76
Amount of loan applications accepted	$3,918,000
Number of applications withdrawn	6
Amount of withdrawn applications	$ 275,600
Number of applications declined	41
Amount of applications declined	$2,137,600
Number of applications still in processing	7
Number of loans approved	22
Amount of approved loans	$ 528,400

SOURCE: Philadelphia District Office, Region III, Small Business Administration.

Table 3 Q

MONTHLY PERCENT CHANGE IN NONMANUFACTURING EMPLOYMENT BY DIVISIONS
1978, 1979, AND 1980 IN TMI AREA 1/

Year & Division	Dec/ Jan	Jan/ Feb	Feb/ Mar	Mar/ Apr	Apr/ May	May/ Jun	Jun/ Jul	Jul/ Aug	Aug/ Sep	Sep/ Oct	Oct/ Nov	Nov/ Dec
1978												
TOTAL, ALL NONMFG.	-	+2.4	-1.2	+4.5	-1.3	-1.0	-1.3	+0.02	+0.1	+0.4	+0.2	-0.1
Contract Construction	-	+6.7	-3.4	+21.4	+7.0	+4.6	+2.9	+2.5	-1.4	-1.8	-3.2	-4.1
Transportation & Public Utilities	-	+4.5	-2.6	+5.8	+1.6	-0.3	-0.3	0	+0.6	-0.3	0	-1.0
Wholesale & Retail Trade	-	+3.9	-3.7	+6.7	+1.1	+0.9	-0.3	-0.3	-0.3	+0.9	+1.7	+0.1
Finance, Insurance & Real Estate	-	+3.4	-2.8	+5.3	0	+1.4	0	+0.9	-0.5	0	+0.9	0
Government	-	+4.4	-1.5	+2.8	-0.1	-0.3	-4.7	-0.5	+1.0	+2.5	+0.1	+0.1
Other Nonmfg.	-	-3.7	+4.5	-1.2	+1.8	+1.8	-0.5	0	-0.6	-1.1	-0.6	-0.4
1979												
TOTAL, ALL NONMFG.	-2.5	+1.1	-0.7	+0.8	+1.0	+0.3	-1.0	-0.1	-0.3	+0.5	+3.3	-0.1
Contract Construction	-10.4	-6.9	+6.0	+3.1	+4.7	+2.4	+2.8	-0.4	-1.9	+0.8	+1.6	-2.3
Transportation & Public Utilities	-2.9	+4.3	-3.2	+1.0	+0.3	+1.3	-0.6	+0.3	-0.3	-0.6	+5.5	-2.1
Wholesale & Retail Trade	-2.7	-1.7	+0.9	+1.5	0	0	-0.6	+0.2	-0.3	-0.3	+2.1	+0.8
Finance, Insurance & Real Estate	0	-0.9	+1.4	0	-0.4	+1.8	-0.4	+0.4	+0.4	-0.4	+1.8	0

Table 3 Q (Cont.)

Year & Division	Dec/ Jan	Jan/ Feb	Feb/ Mar	Mar/ Apr	Apr/ May	May/ Jun	Jun/ Jul	Jul/ Aug	Aug/ Sep	Sep/ Oct	Oct/ Nov	Nov/ Dec
1979 Cont'd.												
Government	-1.2	+1.5	-0.4	+0.3	+1.0	-1.6	-3.3	-0.3	+1.0	+1.6	+0.7	-0.1
Other Nonmfg.	-1.9	+6.6	-4.6	+0.3	+1.7	+1.7	-0.2	+0.2	-0.4	-0.8	+8.2	+0.2
1980												
TOTAL, ALL NONMFG.	-2.5	-0.7	+1.0	+0.9[P]								
Contract Construction	-7.9	-4.3	+1.3	+5.7[P]								
Transportation & Public Utilities	-1.3	+0.3	+0.6	+0.6[P]								
Wholesale & Retail Trade	-3.6	-1.7	0	+0.7[P]								
Finance, Insurance & Real Estate	0	+0.4	+0.4	0 [P]								
Government	-2.0	+0.1	+2.5	+0.8[P]								
Other Nonmfg.	-1.1	0	+0.7	+0.2[P]								

1/ Includes the seven counties of the Harrisburg, York, Lancaster and Lebanon Labor Market Areas. These seven counties are all partially located within the 20 mile radius of TMI. Percentages derived from employment data not seasonally adjusted.

P = Data preliminary for April, 1980.

SOURCE: Office of Employment Security, Pennsylvania Department of Labor and Industry.

the accident, 8,000 new nonmanufacturing jobs were created in the TMI area.

Table 3Q shows the monthly percent changes in nonmanufacturing employment in the TMI area for six divisions of the nonmanufacturing sector, beginning with 1978. As shown in the table, there was no pervasive fall-off in employment in the months following the accident, although several of the sectors did experience continual fluctuations month by month. Such changes as seen in contract construction and wholesale and retail trade are normal, and are reflective of the seasonal nature of these businesses. In all divisions there were no abrupt shifts in employment in the post-accident period, once seasonal factors were discounted.

In comparison to the United States and Pennsylvania as a whole, the TMI area has generally mirrored their performance. (See Table 3R.) Comparisons on a month-by-month basis show the TMI area moving almost always with either the state or the U. S. at generally the same rate. In the second quarter of 1979 (the three month period following the accident), the TMI area experienced employment gains in nonmanufacturing. This is when absolute losses in employment might have been expected due to TMI. The third quarter of 1979 saw nonmanufacturing employment in the TMI area slipping slightly, and the state as a whole exhibited similar characteristics.

3.2.12 Other Factors Affect Nonmanufacturing Economy

The Pennsylvania Department of Commerce's data collection effort during the spring of 1980 also determined what factors other than TMI were negatively affecting the nonmanufacturers' operations during the year 1979.

A listing of the factors influencing the nonmanufacturing economy is shown on Table 3S. The table indicates the total number of times a particular negative factor was mentioned by the respondents as extrapolated to the universe. More than one factor was often mentioned by each respondent.

The most frequently mentioned factor was increased energy costs. The second most important factor was increased costs of raw materials and supplies. It is noteworthy that these two factors were also considered most significant by manufacturers (see Table 2T, in Section 2.2.12).

In nonmanufacturing there are four factors which were seen to be of almost equal relative importance to the sector as a whole. However, the relative importance of these four factors varies from division to division. The four are: in-

Table 3 R

MONTHLY PERCENT CHANGE IN TOTAL NONMANUFACTURING EMPLOYMENT
U.S., PENNSYLVANIA, AND SEVEN COUNTY TMI AREA
1978, 1979, AND PART OF 1980

Year & Area	Dec/ Jan	Jan/ Feb	Feb/ Mar	Mar/ Apr	Apr/ May	May/ Jun	Jun/ Jul	Jul/ Aug	Aug/ Sep	Sep/ Oct	Oct/ Nov	Nov/ Dec
1978												
United States	-	+0.3	+1.3	+1.7	+0.9	+1.1	-1.0	+0.8	+0.6	+0.9	+0.7	+0.4
Pennsylvania	-	+0.1	+1.7	+2.5	+0.8	+1.2	-1.0	-0.3	-0.05	+0.5	+0.4	+0.02
7 County TMI Area	-	+2.4	-1.2	+4.5	+1.3	+1.0	-1.3	+0.02	+0.1	+0.4	+0.2	-0.1
1979												
United States	-2.4	-0.01	+1.5	-0.2	+1.1	+0.9	+0.2	+0.03	+0.5	+0.8	+0.5	+0.2
Pennsylvania	-1.3	-2.0	+1.2	+2.1	-0.01	+0.2	-1.3	-0.1	+0.1	+1.2	+0.5	+3.5
7 County TMI Area	-2.5	+1.1	-0.7	+0.8	+1.0	+0.3	-1.0	-0.1	-0.3	+0.5	+3.3	-0.1
1980												
United States	-2.2	+0.2	+0.6	NA								
Pennsylvania	-2.7	-2.0	+1.8	NA								
7 County TMI Area	-2.5	-0.7	+1.0	+0.9[P]								

NA = Not available.
P = Data preliminary for April, 1980.

SOURCE: Office of Employment Security, Pennsylvania Department of Labor & Industry.

Table 3 S

OTHER FACTORS HAVING NEGATIVE EFFECT ON NONMANUFACTURING SECTOR ENTITIES DURING 1979

Factors In Order of Descending Importance		All Divisions		Rank of Importance By Division							
Rank	Name	Number of Times Indicated: All Divisions	% of Total Times Indicated	Agriculture, etc.	Mining	Construction	Trans. & Public Utilities	Wholesale Trade	Retail Trade	Finance, etc.	Services
1	Increased Energy Costs	8,096	25.4	5	1	2	1	1	1	1	1
2	Increased Costs: Raw Materials/Supplies	6,145	19.2	1	3	3	3	2	3	5	2
3	Decline in Consumer Spending	5,774	18.1	4	NI	4	5	4	2	4	3
4	High Interest Rates on Borrowed Capital	5,604	17.5	3	I	1	2	5	5	2	4
5	Gasoline Shortage	4,774	15.0	I	NI	5	4	3	4	3	5
6	Loss of Market	1,089	3.4	6	NI	6	6	6	6	6	6
7	Labor Disputes	443	1.4	NI	NI	7	7	7	6	7	7
	TOTAL FREQUENCY	31,925	100.0								

NI = Not Indicated

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

creased costs of raw materials and supplies; decline in consumer spending; high interest rates on borrowed capital; and the gasoline shortage.

The variation in importance of the factors among the divisions is also shown on Table 3S. For example, in the mining division, high interest rates on borrowed capital was felt to be equally as important as increased energy costs. And, in retail trade, decline in consumer spending ranked second behind increased energy costs. The rank order of the factors in the services division was identical with the rank order for the nonmanufacturing sector as a whole.

4.0 TOURISM

Tourism is one of Pennsylvania's largest industries. It is the generator of 180,000 jobs and nearly $300 million in state tax revenues, based upon total annual traveler expenditures of about $4.7 billion a year. Visitors usually spend about $600 million a year in southcentral Pennsylvania.

The tourist industry was directly affected by the TMI accident -- both businesses and employees were impacted. Events which followed soon after the TMI accident created additional hardships for the industry. The Amish polio scare in May, the gasoline shortage in June, and the slowly worsening condition of the national economy, as reflected in rising unemployment and increasing inflation, became major contributors to the decline in tourism.

TMI caused an immediate loss for the tourist industry of an estimated $5.0 million in a six county area, during the three to four week period immediately following the accident. Following this period, tourism losses continued through the summer and into the fall, with the heaviest losses occurring during the summer season. But the gasoline crisis and other factors were identified as the paramount reasons for these losses. TMI was ranked as much less important.

The 1980 season appears to be much improved over 1979. Hotel/motel occupancy rates and tourist attraction attendance are back to or approaching pre-accident levels. There remain only small lingering concerns among some potential visitors about the safety of the TMI area.

4.1 Economic Impacts

The immediate effect of TMI on tourist-related businesses (hotels, motels, attractions, restaurants, service stations and other establishments located in the counties surrounding TMI) was the cancellation of major conferences and conventions, bus tours, and hotel and motel reservations. This produced a general decline in business levels for activities affected by the travelers' dollars. The immediate impacts to the TMI area can be described as:

- Cancellation of conventions.
- Cancellation of group tours.

- Loss of drive-through, work-related, and pleasure overnight business.

- General loss of appeal as a tourist destination.

4.1.1 Emergency Period Losses

The duration of the immediate period of loss due to the March 28, 1979 accident was quite short. In the Lancaster area, tourist-related business losses following the accident lasted about three to four weeks. During this time, there were a number of cancellations, and drive-through traffic avoided the area. The most severe impacts appear to have occurred during the first two to three weeks. Since the summer travel season was still about two months off, it was not the "vacation" business which was affected, but rather the loss of conventions and groups on one-day or weekend trips. An estimate of the severity of the immediate impact to the Lancaster area was that tourist business levels were off in excess of 50 percent during the first month following the accident.

Similarly, the Harrisburg area was also affected immediately following the accident. During the first critical days and for several weeks following the accident, tourist-related business suffered a reduction of sales in excess of 50 percent. The immediate losses caused by TMI were considered to be major in the Harrisburg area. Such losses included the cancellation of the National Hardware Dealers' spring convention at the Pennsylvania Farm Show Building -- resulting in an estimated loss of $500,000 in receipts to the area's businesses. This particular convention cancellation resulted in the cancellation of reservations for 2,300 rooms in major lodging establishments in and around the Harrisburg area.

The Gettysburg area experienced less of an impact than either Harrisburg or Lancaster. The duration of the immediate adverse effects is considered to have been shorter -- only the first two weeks following the announcement that a problem existed at the plant. The greater distance of the Gettysburg area from TMI is assumed to be the reason for this.

While there were immediate losses for many tourist-related businesses, some lodging accommodations in the vicinity of TMI profited, with April business being above normal. These were the ones which hosted the hundreds of reporters, engineers, medical personnel and technicians who were responding to the accident.

To measure dollar losses in tourism during the immediate period following the crisis, the Bureau of Travel Development in the Pennsylvania Department of Commerce obtained information from tourist-related businesses in the 30-day period immediately following the incident. A small sample of tourist-related businesses within a six county area surrounding the plant was contacted by the Bureau for the purpose of identifying the immediate losses incurred as a result of the crisis. The Lancaster, Harrisburg and Gettysburg areas were the focus of the effort. Information was obtained from ten major lodging and convention sites in the six county area; it indicated that initial sales losses of nearly $2.0 million were directly attributable to TMI. This information was provided by managers and/or owners of the businesses, and was reported from business records.

Based upon the reported $2.0 million in lost sales revenues, the Department extrapolated the data to reflect estimated sales losses. The extrapolated figures estimated that the immediate loss was on the order of $5.0 million. This calculation utilized an average sales loss of $762 associated with each employee in the sample and the 1976 employment in all 244 lodging and convention establishments in the six county area (6,240) around TMI.

The estimated $5.0 million immediate short term losses in revenue does not represent the total loss sustained by the tourism community. The figure would certainly be higher if additional establishments such as independent restaurants, service stations, and entertainment sites were to be considered. Nor does it include wage losses of employees in the tourism industry -- some tourist businesses made cutbacks in employment in order to offset their loss of income.

4.1.2 Short Term Impacts

Immediate economic impacts of the accident were easily linked to TMI by lodging and convention site businesses. This is because TMI was the only negative factor obviously present during April, 1979. But in subsequent months, other events occurred which also negatively affected tourism. Included here are the alarm over the outbreak of polio among the Amish and Mennonite communities in May, 1979, and the increasing scarcity and unavailability of gasoline. Thus, the continuing effects of TMI beyond April became masked by the compounding effects of these additional factors.

The experience of the tourist industry led the industry to believe that TMI had a continuing impact on tourism beyond the immediate period following the accident, even though it

was felt that other factors played a more dominant role in creating the general tourism malaise. For example, findings in mid-August, 1979 indicate that tourism in Lancaster County was off 50 percent for that year (or approximately $150 million), partly because of the nuclear accident.[1/]

By early November of 1979, when the Pennsylvania Department of Commerce again contacted representative lodging and convention sites to solicit opinions concerning the continuing effects of the accident, the gasoline situation was consistently ranked as the number one cause of continued tourist business losses, and TMI was felt to be much less important. Lancaster area businesses ranked TMI third behind the fuel situation and the polio outbreak as a cause for the season's losses. The Gettysburg area businesses did not consider any effects attributable to TMI to be a significant cause of its continuing losses.

It appears that as the weeks immediately following the accident turned into months, the tourist's memory of TMI faded and the public's image of the TMI area improved. However, the November findings did indicate a sensitivity among Harrisburg tourist businesses to the events taking place at TMI and the publicity given to them in the news media. Because the Harrisburg area is so closely associated with TMI, and is in close proximity to the plant, this area could have been affected more readily by continuing events occurring at the plant than others located at greater distances.

4.1.3 Public Attitudes

Several weeks after the TMI incident, private sector hoteliers, restaurateurs, and other travel industry members sponsored a research study to determine the effects of the TMI incident on tourism, and a consultant was retained to determine the impact of TMI on travel plans.

The study was conducted between April 26 and April 30, 1979, through the use of a telephone inquiry of six geographic areas in and around Pennsylvania. This survey was carried out prior to the emergence of other factors (the polio outbreak, the gasoline shortage, and the economic downturn) which later had a great bearing on tourism during the summer season. A total of 608 interviews were conducted in the following areas:

[1/] Testimony of James R. Bartlett, Executive Director of the Pennsylvania Dutch Visitors Bureau, before the House Select Committee investigating Three Mile Island, August 22, 1979.

Allentown/Reading/Scranton/Wilkes-Barre
Baltimore
Cleveland
Long Island
Northern New Jersey
Philadelphia/Wilmington

Those questioned were household heads who intended to travel by car or bus during the succeeding six months (i.e., the 1979 summer tourist season), and who would bring along one or more pre-teenage children on the trip. The study found that nearly all the respondents were aware of the TMI incident; therefore, their decision to travel to Pennsylvania could have been influenced by the TMI event.

In answer to a question concerning whether the respondents would be traveling to Pennsylvania, two percent said they would avoid the state entirely because of concerns relating to TMI, nuclear power, nuclear plants, radiation, and radioactive fallout. Respondents who either intended to travel to Pennsylvania, or who would not do so for reasons other than TMI (but were still included in the survey), reported that they would avoid seven selected travel destinations by the following percentages:

Gettysburg	Less than 1%
Harrisburg	6%
Hershey	1%
Lancaster/Dutch Country	1%
Poconos	Less than 1%
Philadelphia	Less than 1%
Pittsburgh	Less than 1%

Harrisburg, probably because of its association with nearby TMI, was the only selected area where a notable share of the respondents who would come to the state did not want to visit. Only about one percent of the family travelers indicated they would avoid the other six selected areas.

Because of the national news coverage the TMI incident received, it was remarkable that such a small percentage of the family travelers' plans to visit Pennsylvania were negatively affected.

4.2 The Tourist Industry One Year Later

During the first week of June, 1980, the Department of Commerce contacted eight large hotel/motel establishments and 11 travel/tourist attractions to determine past impacts and continuing TMI effects. The eight hotel/motel establishments

were among those which were originally contacted in April, 1979, immediately after the accident. The study attempted to assess whether these tourist operations experienced any noticeable effect from TMI on their businesses during the 1979 season, and whether any TMI effects were continuing into the 1980 season.

4.2.1 Losses in 1979

This study indicated that, with one exception, all of the eight sampled hotel and motel establishments reported noticeable adverse effects from TMI on their businesses during the 1979 season. The one exception was a facility located relatively close to TMI which accommodated technicians and others involved in events occurring at the plant.

The 11 sampled travel/tourist attractions ranged from small establishments employing only a few persons to a very large operation employing over 1,000. These establishments represent those geared to "vacation trade". Almost all of the attractions indicated that the 1979 season reflected some losses due to TMI. Attendance at most of these facilities in June, 1979 was down well below June, 1978 levels. Three-fourths had attendance anywhere from 25 percent to 50 percent below 1978 levels.

A comparison of tourist industry data for the calendar year 1979 to similar data for 1978 indicates that tourism in the six county area (Cumberland, Dauphin, Lancaster, Lebanon, Perry and York) ringing TMI did not increase as much as it did in the whole state. Tourist industry information provided by the Pennsylvania Department of Commerce is shown on Table 4A. This data indicates that the six county area, while exhibiting tourism growth in 1979 compared to the previous year, did not do quite as well as did the rest of the state. This data supports the contention made earlier that the six county tourist industry must have had additional negative factors present which were retarding its growth when compared to the rest of the state. These factors would appear to have been the polio outbreak, TMI, and an unusual amount of rainy weather locally.

4.2.2 No Continuing Losses

The sampled hotel/motel establishments reported generally no adverse impacts from TMI occurring during the 1980 season. In addition, their responses indicate that 1980 is a much better season for the hotel/motel establishments than was 1979. Responses concerning June, 1980 occupancy rates show

Table 4 A

COMPARISON OF TRAVEL INDUSTRY DATA
FOR TMI AREA AND STATE, 1978-1979

Indicators	6 TMI Counties % Increase	State % Increase
Travel Expenditures	11.3	13.1
Travel Generated Payroll	9.2	11.4
Travel Generated Employment	2.3	3.2
Travel Generated State Tax Receipts	12.5	13.1

SOURCE: Pennsylvania Department of Commerce.

that, with one exception, the eight sampled hotels/motels had occupancy rates equal to or exceeding June, 1978 (pre-TMI) levels.

The 1980 season for the travel/tourist attraction operators also seems much improved. This is reflected in responses which show that only four of these operators stated that they still were experiencing some TMI effects on their business. But even for these operators, the estimated value of losses was slight. Moreover, reported June, 1980 attendance at these attractions indicates that their business has recovered from the 1979 conditions, and has either approached or attained pre-TMI (1978) levels.

Comments from the sample of hotel/motel and travel/tourist operations in June, 1980 confirmed that in their opinion, the poor 1979 tourist season was due more to factors such as the gasoline shortage, the polio scare and national economic conditions, rather than TMI.

4.2.3 TMI's Overall Impact Minor

The Department of Commerce cooperates with local travel agencies across the Commonwealth in the maintenance of visitor information centers. A log of people visiting these centers is maintained and is forwarded to the Bureau of Travel Development on a monthly basis. Information on the total number of visitors recorded at visitor information centers located in Cumberland and York counties, as well as those recorded at centers in the rest of the state, is shown in Table 4B. This data indicates that the number of visitors at the Cumberland and York centers declined from April, 1979 through November, 1979 when compared with the previous year.

The percent decline from 1978 levels increased from April through July, but improved somewhat during August and September. The percent decline in visitors at the Cumberland and York centers was steeper than in the rest of the state during May through August, but less than the percentage of decline in the state in September. This steeper decline at the Cumberland and York centers could reflect the effects of TMI and the polio outbreak -- two experiences which were unique to this area. After the summer tourist season, the Cumberland and York centers generally exhibited an improved condition over the rest of the state.

From December, 1979 and into the 1980 winter season, the Cumberland and York centers exhibited a greater number of registrants than during the winter months of the previous

Table 4 B

TRENDS IN VISITOR CENTER REGISTRANTS

	Cumberland & York County Visitor Centers					Visitor Centers for the Rest of PA				
Month	1978	1979	% Change	1980	% Change	1978	1979	% Change	1980	% Chang
January		2,856		3,728	+30.5		13,095		12,744	- 2.7
February		3,201		4,237	+32.4		11,684		12,408	+ 6.2
March		6,827		5,138	-24.7*		19,155		15,021	-21.6
April	8,689	8,175	- 5.9	7,738	- 5.3	26,496	24,804	- 6.4	22,548	- 9.1
May[1/]	8,897	6,783	-23.8*			32,157	25,872	-19.5		
June[1/]	11,301	7,611	-32.6*			46,937	34,193	-27.1		
July[1/]	15,750	9,171	-41.8*			68,103	40,113	-41.2		
August[1/]	15,065	11,060	-26.6*			63,157	48,542	-23.1		
September[1/]	8,597	7,518	-12.5			42,421	33,453	-21.1		
October	9,046	7,504	-17.0*			36,411	30,480	-16.0		
November	6,029	5,820	- 3.5			22,873	20,512	-10.3		
December	4,019	4,574	+13.8			16,543	16,200	- 2.1		

[1/] Summer Tourist Season

*Worse than rest of state centers

SOURCE: Pennsylvania Department of Commerce, Bureau of Travel Development.

year. However, by March, 1980, the number of visitors at the Cumberland and York centers was again down in comparison to March, 1979, and this decline was worse than that exhibited in the rest of the state. This excess slump could be attributed to the widespread publicity which occurred at the time of the March, 1980 "anniversary" of the TMI accident.

The utility of visitor center data is that it shows the impact of adverse economic factors affecting the entire state as well as the local TMI area. Differences between the TMI counties (Cumberland and York) and the rest of the state could reflect conditions only present in the local area -- like TMI and the polio scare (even though polio effects would be more pronounced in Lancaster County than in Cumberland or York Counties). Consequently, differences in the percentage declines between the Cumberland and York centers and the state (which ranged between one and six percentage points) could be associated with TMI. Thus, the effects of TMI on tourist visits occurred during the months of May through August in the height of the 1979 summer tourist season.

The decrease in tourist visitors linked to TMI during the summer season of 1979 appears to be very close to the impact projected by the April, 1979 survey on tourist travel plans discussed in section 4.1.3; i.e., a projected loss of from one to six percent in the number of visitors in the TMI area.

4.2.4 Increased Visitors at TMI Site

Since the TMI incident created so much national publicity, the site of the plant has become an attraction of sorts for the tourist and the curious. The Metropolitan Edison company maintained a visitors' center and observation facility since 1970 adjacent to the plant. Before the incident, the center normally attracted an average of 16,000 people a year, mostly school groups and occasional passers-by. The largest daily attendance was 350 visitors; and for the entire period of nine years prior to the accident, a total of 150,519 persons visited the center.

Following the crisis the center was closed during April, May and June of 1979. It reopened on July 7, 1979 with a 19-minute video tape produced by the utility explaining the accident and the radiation doses emitted -- on the first day, 1,200 visitors came to the center.

Average attendance is running higher than before the accident. Between July 7, 1979 and March 31, 1980, the center was visited

by 60,042 people. An article in the Harrisburg Evening News, dated July 9, 1980, indicated that more than 67,000 persons visited the center since the reopening of the facility.

Because of the increased number of visitors to TMI, it is assumed that some tourist dollars are flowing into the area as a direct result of the accident, which may tend to offset some of the losses that the tourist industry experienced as a result of the accident.

The peaks in the number of visitors to the center are concentrated during the summer tourist season when travelers visiting in and around the TMI area decide to include the site on their itinerary.

4.2.5 A Media Campaign

Because of losses sustained and anticipated by the travel industry, the Commonwealth of Pennsylvania decided soon after the accident to undertake a media advertising campaign to attempt to overcome the negative impacts of the accident.

At that time, such an effort was seen as essential to combating the negative publicity produced by the accident and in reinforcing the image of Pennsylvania as an ideal place for groups to meet, and for families to visit.

The media campaign began before the 1980 travel season started. Using the theme, "You've Got a Friend in Pennsylvania", the first phase of the campaign was carried out from April 24 through June 6, 1980. Ninety-five percent of the campaign was geared to television, and was oriented to an audience within 300 miles of the center of Pennsylvania. The campaign encouraged people to visit the Commonwealth as a whole. However, specific visual reference to Pennsylvania Dutch areas was part of 30-second television commercials and was specifically referenced during May, 1980 in full page advertisements placed in tourist/travel magazines and in the May 11, 1980 issue of The New York Times magazine. (Pennsylvania Dutch areas are located in some of the counties surrounding TMI.)

There is, as yet, no data showing whether or not the campaign has increased tourist interest in the southcentral Pennsylvania region. But one of the respondents to the sampling of representative tourist establishments conducted by the Pennsylvania Department of Commerce in June, 1980 did state that

business was back to normal, and credited this to the "You've Got a Friend in Pennsylvania" campaign.

4.2.6 An Underlying Concern

The tourism industry is dependent upon a favorable "area image" in order to continue to be able to retain and attract new visitors each year. The industry is vulnerable to negative publicity about local events, particularly to those events which receive nationwide publicity. TMI was certainly such an event.

The 1980 season appears to have had a good beginning -- TMI does not seem to be adversely affecting the travel industry, and the gasoline availability and polio problems of last year have vanished. The June, 1980 Pennsylvania Commerce Department study of TMI effects on a sample of 11 tourist-related establishments sought opinions concerning expectations about the future effects of TMI on business. All respondents expressed optimisn over the future, but did note that the venting of gases and other TMI clean-up operations could result in adverse publicity. The experience of the industry has convinced it that adverse publicity has and can continue to have a detrimental effect.

5.0 HOUSING

A catalogue of the Three Mile Island nuclear accident's effects on the major components of housing in the total 20 mile radius from TMI generally revealed no significant and continuing negative impact on the area. There is scattered evidence, however, that some aspects of housing in the five mile radius were adversely affected by TMI for several months immediately following the accident.

Factors pointing to minimal disruption of housing for the total study area (20 mile radius) include:

- Relatively strong residential property sales throughout 1979 despite the accident and unfavorable home mortgage market conditions. By the end of 1979, sales had dropped only 7.3 percent under the 1978 rate.

- Continued appreciation of residential property values at an 11.6 percent increase over 1978 according to State Tax Equalization Board data. Even property located within a five mile radius of TMI reached a 10.8 percent increase in value; and if figures from the Central Penn Multi-List realty service are used, the five mile area showed greater appreciation than the total 20 mile radius.

- An insignificant increase of 6.3 percent in 1979 over 1978 for the number of days residential property remained on the market. The average length of time in 1978 was 79.3 days compared with 84.3 days for 1979.

- An analysis of the real estate transfer tax collections in the six county area surrounding TMI reveals no statistically perceptible drop-off in revenues.

- The opinion of 90 percent of a representative numbet of area realtors that any decline in 1979 for real estate activity stemmed from economic conditions rather than the accident.

- Absence of a pattern linking distance from TMI and the degree of decline in 1979 for the number and dollar amount of conventionally financed home mortgages.

- An increase in 1979 over 1978 of VA and FHA financed mortgages for single family houses in low income tract areas, which traditionally experience the effects of mortgage money withdrawal first when adverse conditions occur.

- Lack of evidence that post-accident rental vacancies are attributable to TMI. Both private and county housing authority managers report no continuing impact from TMI on unit vacancy rates.

Evidence does exist that the accident caused short term negative effects on area housing, especially in the five mile radius from TMI.

- Second quarter 1979 State Tax Equalization Board (STEB) data showed a 45 percent drop for residential property sales from 1978 second quarter levels in the five mile radius.

- Second quarter 1979 figures from the Central Penn Multi-List showed that in the five mile radius, the number of days property remained on the market before a sales contract was signed increased by 31.5 percent over the second quarter of 1978.

- In July, 1979 residential construction starts were 30 percent below July, 1978 in a six county area surrounding Three Mile Island, while the state as a whole declined by 17 percent.

- Potential for reduction of new residential and commercial construction exists since 17 percent of the builders known to work within the 20 mile radius from TMI indicated they would not build within five miles of the island.

Factors other than the accident, such as economic conditions, may have contributed to these negative impacts. But the tightening money supply and accompanying high interest rates for residential mortgages in 1979 had just begun to develop in the second quarter, so it is not likely that this condition precipitated the second quarter decline in sales, or the longer period of time required to sell property in the five mile radius.

The analysis and conclusions contained in this section are drawn from STEB and Multi-List data and are on an aggregate basis only. Individual properties, depending on location, price range and other factors may have experienced dissimilar trends than those of the area as a whole.

When the performance of the five mile area for residential property sales is examined in a composite yearly context for 1979, there is little evidence that negative effects on this activity stemming from the accident continued to persist. By the year's end, the sales in the five mile radius were 10.9 percent below those recorded for 1978, but more distant radii such as the ten and 20 mile rings also registered similar declines -- 10.3 percent in the ten mile ring, and 9.7 percent in the 20 mile radius. Economic conditions rather than apprehension and fear associated with the accident seem responsible for the continued sales decline.

It is significant that residential construction starts declined in the counties ringing TMI during July, 1979, one of the first months which would be most likely to reflect a decline precipitated by TMI. Data on construction starts for July is based on decisions builders and lending institutions made in the months immediately following the accident about whether they would build and grant construction loans in areas located near TMI.

Using the rest of the state as a standard, after July, 1979 there was no pattern which suggested that residential construction start activity was influenced by the accident in the six counties surrounding TMI.

5.1 Residential Property Sales Volume, Price, and Number of Days on the Market -- Data Sources

To determine the impact of the accident on residential real estate located within the 20 mile radius, sales volume, average property sales price, and number of days on the market during the second, third and fourth quarters of 1979 were compared to the corresponding quarters of 1978.

Data from two different sources was used for this comparison. Figures from Pennsylvania's State Tax Equalization Board which encompass the majority of houses sold, and exclude only those financed through private agreements, and sales of real property on leased land were used as the major data source. Other figures were derived from the Central Penn Multi-List, a service which, among other things, provides data about transactions of its member real estate firms. Although not all realtors in the greater Harrisburg area subscribe to this service, most of the major realtors are members. During the third quarter of 1979, over 50 percent of the sales in the five mile radius were through members of the Multi-List service. Therefore, the Multi-List data represents a fair sample of real estate transactions.

Since Multi-List figures are gathered from a different base than STEB figures, no accurate conclusion can be drawn by comparing the two against each other. Multi-List data is presented because it is interesting to see where these figures parallel or conflict with STEB trends.

To ascertain whether proximity to TMI had any relation to sales volume, value, and days on the market, the total 20 mile area is compared with the five mile radius.

Fluctuations in mortgage money interest rates and loan-to-value ratios were considered in the examination of sales and values, since real estate business trends are often affected by these factors.

Tables 5A, 5B and 5C, and Charts 5A and 5B display the results of the 1978 versus 1979 comparison for volume of residential property sold, sales prices, and days on the market.

The following sections examine the performance of key real estate market indicators on a quarterly basis.

5.1.1 Sales Volume for Total 20 Mile Radius

Second Quarter, 1979: Data from STEB indicated a 15.3 percent decline in the number of houses sold compared to the second quarter of 1978. Sales began to decline in April, and continued the downward trend through June, a month which experienced the deepest decline.

Mortgage rates by April, 1979 had risen in the southcentral Pennsylvania area to a range between 9 3/4 and 11 percent, an increase over first quarter, 1979 levels of 9 1/4 to 10 3/4 percent. During the second quarter, a 50 to 95 percent loan-to-value ratio prevailed, in contrast to the first quarter range of from 75 to 95 percent.

Multi-List sales during this period, however, showed a 5.4 percent upsurge.

Third Quarter, 1979: The decline of the second quarter slowed down during this period. Only a 4.2 percent drop occurred according to STEB data. In July, sales increased, but still did not reach 1978 levels. By August, however, sales began dropping again, only to recover in September at levels above 1978.

Table 5 A

RESIDENTIAL PROPERTY SALES BY RADII FROM TMI
BY QUARTERS FOR 1978 AND 1979

	Radius from TMI				
	0-5 Miles	6-10 Miles	11-15 Miles	16-20 Miles	20 Mile Total
First Quarter					
1978	69	260	1,329	449	2,107
1979	79	291	1,514	467	2,351
% Change	14.5	11.9	13.9	4.0	11.6
Second Quarter					
1978	154	449	1,946	760	3,309
1979	85	386	1,699	633	2,803
% Change	-44.8	-14.0	-12.7	-16.7	-15.3
Third Quarter					
1978	109	418	1,879	740	3,146
1979	129	377	1,819	688	3,013
% Change	18.3	- 9.8	- 3.2	- 7.0	- 4.2
Fourth Quarter					
1978	88	331	1,312	449	2,180
1979	82	254	1,081	377	1,794
% Change	- 6.8	-23.3	-17.6	-16.0	-17.7
Year Totals					
1978	420	1,458	6,466	2,398	10,742
1979	375	1,308	6,113	2,165	9,961
% Change	-10.7	-10.3	- 5.5	- 9.7	- 7.3

SOURCE: Pennsylvania Department of Community Affairs, State Tax Equalization Board Assessor's Office.

This pattern seems to parallel fluctuations in the mortgage money market. Mortgage rates increased from a second quarter 9 3/4 to 11 percent range, and a 50 to 95 percent loan-to-value ratio, to a 10 3/4 to 11 1/2 percent range. The percent of money loaned in ratio to the house price also decreased.

Multi-List figures were down 2.1 percent from 1978.

Fourth Quarter, 1979: In this quarter, STEB figures indicated a 17.7 percent drop from fourth quarter 1978 activity. In November, declines below 1978 activity had begun in the ten, 15 and 20 mile radii (the five mile radius showed a zero percent change) and continued through December.

Rapid changes were occurring by October in the mortgage market. Mortgage interest rates were floating between 10 3/4 and 13 1/4 percent, with most loans going for a 66 to 80 percent loan-to-value ratio. Many lending institutions in south-central Pennsylvania were "off the market" and were negotiating only existing mortgages held by the institutions, or serving only existing customers.

Multi-List trends indicated a 1.2 percent decrease.

Analysis: Sales volume during 1979, according to STEB data, was 7.3 percent below 1978. The second quarter decline and especially the substantial June dip could have been related to TMI. Since a 60 to 90 day lag between a signed sales agreement and the property settlement date is normal, the large dip in June, 1979 suggests that immediately after the accident there may have been fewer sales agreements signed, possibly because of concerns about locational safety and property values.

Other facts also point to TMI as a possible contributor to the second quarter slide: extensive cutbacks on residential mortgage money by lending institutions had not occurred yet, and the decline appears to lessen as the distance from TMI increases.

During the third and fourth quarters of 1979 (except for an upward swing in July), STEB data shows a decline from the previous year. This decline paralleled the increasing unavailability of mortgage money and its accompanying higher interest rates, indicating that tight mortgage market money policy rather than TMI was probably responsible for the major part of the decline during the last two quarters of 1979. Housing sales state and nationwide also declined severely during the latter half of 1979.

Multi-List figures for the two years show a 6.3 percent increase in sales volume in 1979 over the previous year, but most of this increase was derived from sales in the first quarter of 1979. Quarters following the accident either displayed a significantly smaller increase or a slight decrease.

Discrepancies between STEB and Multi-List figures are not surprising since the data for each is not collected from the same base. More weight should be given to STEB figures because its data is more encompassing than Multi-List information.

5.1.2 Residential Property Values for Total 20 Mile Radius

Second Quarter, 1979: Residential property values appreciated by 12.7 percent according to STEB numbers. Prices in all radii (except for May in the five mile radius) were above those for 1978.

Multi-List figures indicated an increase of less than one percent.

Third Quarter, 1979: Prices continued to increase during this quarter and were up 15.4 percent over the previous year. Analysis of STEB data showed that no month or radii in the third quarter experienced a decline.

Multi-List data continued its trend of increasing values over 1978 by registering a 12.4 percent increase in the third quarter.

Fourth Quarter, 1979: STEB statistics indicated a positive percent change of 10.5 above fourth quarter 1978 average prices.

Multi-List figures continued to rise above those for 1978 by averaging out to a 10.6 percent increase for October, November, and December.

Analysis: Property values do not appear to be as sensitive as the volume of sales to the prevailing conditions of 1979. STEB figures indicate an 11.6 percent increase over 1978. Overall, the value of property sold was higher for every month, with the exception of the five mile radius in May, which was two percent below 1978, but up five, 18 and 13 percent respectively in the outlying ten, 15 and 20 mile radii. Data from the Multi-List seems to buttress STEB figures since it indicates a total increase of 8.4 percent over the previous year.

Table 5 B

AVERAGE RESIDENTIAL PROPERTY SALES VALUE BY RADII
FROM TMI BY QUARTERS FOR 1978 and 1979

	Radius from TMI				
	0-5 Miles	6-10 Miles	11-15 Miles	16-20 Miles	20 Mile Total
First Quarter					
1978	$29,957	$38,500	$34,692	$34,581	$34,433
1979	$29,296	$43,379	$37,620	$37,848	$37,036
% Change	- 2.2	12.7	8.4	9.4	7.6
Second Quarter					
1978	$34,219	$41,735	$37,103	$35,296	$37,088
1979	$37,006	$46,356	$40,490	$43,407	$41,815
% Change	8.1	11.1	9.1	23.0	12.7
Third Quarter					
1978	$31,135	$42,606	$39,184	$39,296	$38,055
1979	$38,327	$47,657	$44,552	$45,096	$43,908
% Change	23.1	11.9	13.7	14.8	15.4
Fourth Quarter					
1978	$36,132	$42,301	$38,048	$40,000	$39,120
1979	$40,999	$49,035	$41,584	$41,262	$43,220
% Change	13.5	15.9	9.3	3.1	10.5
Year Totals					
1978	$32,861	$41,286	$37,257	$37,293	$37,174
1979	$36,407	$46,607	$41,062	$41,903	$41,495
% Change	10.8	12.9	10.2	12.4	11.6

SOURCE: Pennsylvania Department of Community Affairs,
State Tax Equalization Board Assessor's Office.

5.1.3 Days on the Market in the 20 Mile Radius

STEB data is not available in a form which can be translated into the number of days property remained on the market between the date it was listed and the date a sales contract was signed. However, Multi-List information on this subject is available on a quarterly basis.

Second Quarter, 1979: There was no significant difference between the number of days on the market for 1979, 82.7, and the 1978 number of 81.6 days. This represents a 1.3 percent increase.

Third Quarter, 1979: The number of days on the market for this quarter was exactly the same for both years -- 73.5 days.

Fourth Quarter, 1979: Again, there was no significant difference between the two years. Property remained on the market an average of 78.5 days for 1979, and 74.4 days in 1978. This averages out to only a 5.4 percent increase.

Analysis: No significant increase of days on the market in 1979 over the corresponding period in 1978 occurred. Days on the market for the year averaged out to a 6.3 percent increase over 1978. Thus, neither buyer resistance stemming from the accident, nor other factors appear to have adversely affected this aspect of the real estate market.

5.1.4 Sales Volume in the Five Mile Radius

Second Quarter, 1979: Home sales dropped 45 percent below the previous year. April, May and June exhibited a continuing downward decline.

Multi-List numbers were 17 percent below 1978 levels.

Third Quarter, 1979: After falling in the second quarter, STEB data registered an 18.3 percent increase over the third quarter of 1978. Sales increased in July, declined in August, but climbed again in September.

The Multi-List figure rose by the same amount in this quarter that it fell during the second quarter of 1979 -- 17 percent.

Fourth Quarter, 1979: The percent change in number of sales was negative, a 6.8 percent decrease under 1978. December was responsible for the decline since October sales were slightly above those for October, 1978. November was exactly the same, but December was off by 67 percent from the previous year.

Table 5 C

NUMBER OF RESIDENTIAL SALES, AVERAGE VALUE, AND TIME ON THE MARKET FOR FIVE AND TWENTY MILE RADII FROM TMI: 1978 AND 1979

	Number of Sales		Average Value		Days on Market	
	0-5 Mile	Total 20 Mile	0-5 Mile	Total 20 Mile	0-5 Mile	Total 20 Mile
First Quarter						
1978	36	497	$37,041	$42,227	81.0	87.6
1979	58	708	$38,044	$42,573	89.9	102.5
% Change	61.1	42.5	2.7	0.8	11.0	17.0
Second Quarter						
1978	64	1,020	$38,460	$42,751	71.0	81.6
1979	53	1,075	$38,735	$46,903	93.4	82.7
% Change	-17.2	5.4	0.7	9.7	31.5	1.3
Third Quarter						
1978	41	1,165	$34,012	$44,114	65.5	73.5
1979	48	1,140	$40,686	$49,573	59.6	73.5
% Change	17.1	- 2.1	19.6	12.4	- 9.0	0
Fourth Quarter						
1978	44	974	$34,694	$42,699	67.0	74.4
1979	45	962	$45,757	$47,204	84.4	78.5
% Change	2.3	- 1.2	31.9	10.6	26.0	5.4
Yearly Totals						
1978	185	3,656	$36,052	$42,948	71.1	79.3
1979	204	3,885	$40,806	$46,563	81.8	84.3
% Change	10.3	6.3	13.2	8.4	15.0	6.3

SOURCE: Pennsylvania Department of Community Affairs, Central Penn Multi-List.

Multi-List sales continued the rise begun in the third quarter of 1979, but by a slower ascent, and were up slightly by 2.3 percent over the fourth quarter of 1978.

Analysis: Based on STEB figures, total residential property sales in the five mile radius in 1979 declined 10.7 percent below 1978 levels. Only first quarter and third quarter sales were above those for the previous year.

Both data sources confirm that residential property sales in the second quarter of 1979 for the five mile radius declined below 1978 second quarter levels. STEB data showed a 45 percent drop in residential property sales. Conditions which existed in the third and fourth quarters of 1979, including a significant cutback in mortgage money availability and escalating interest rates, were not present during the quarter following the accident. Therefore, it appears possible that a reason for buyer resistance in the five mile radius during the second quarter may have been concerns stemming from the accident.

Sales volume fluctuations in the third and fourth quarters for both STEB and Multi-List data coincide with the general mortgage market money conditions described in 5.1.1, and are not likely to have been affected by TMI.

5.1.5 Residential Property Values in the Five Mile Radius

Second Quarter, 1979: While the number of sales were declining during the second quarter of 1979, average sale prices appreciated by 8.1 percent over the second quarter of 1978. May, 1979, however, was down by two percent.

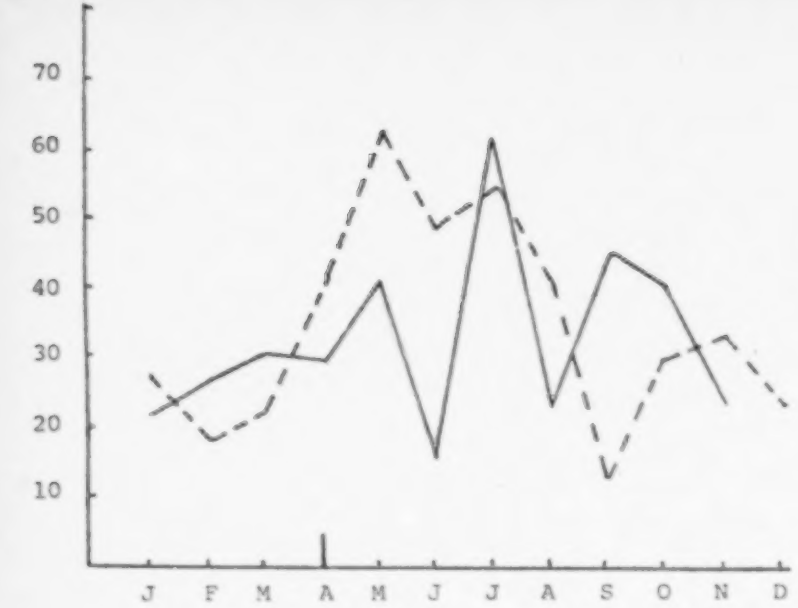
Multi-List data indicates an appreciation of less than one percent.

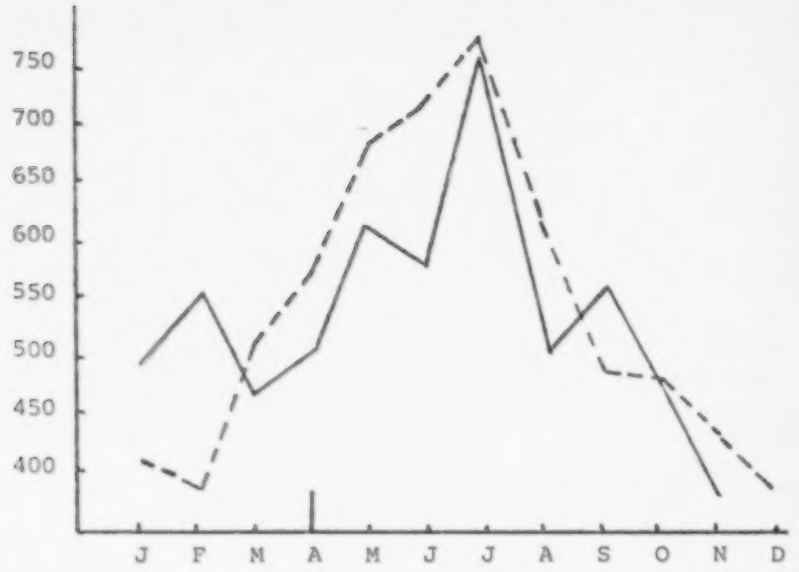
Third Quarter, 1979: Appreciation continued upward in this quarter for both STEB and Multi-List data. STEB registered a 23.1 percent increase, while Multi-List was lower than STEB at a 19.6 percent appreciation level.

Fourth Quarter, 1979: The upward appreciation of the previous two quarters for STEB data continued, but at a slower pace, registering a 13.5 percent increase which tapered off in December.

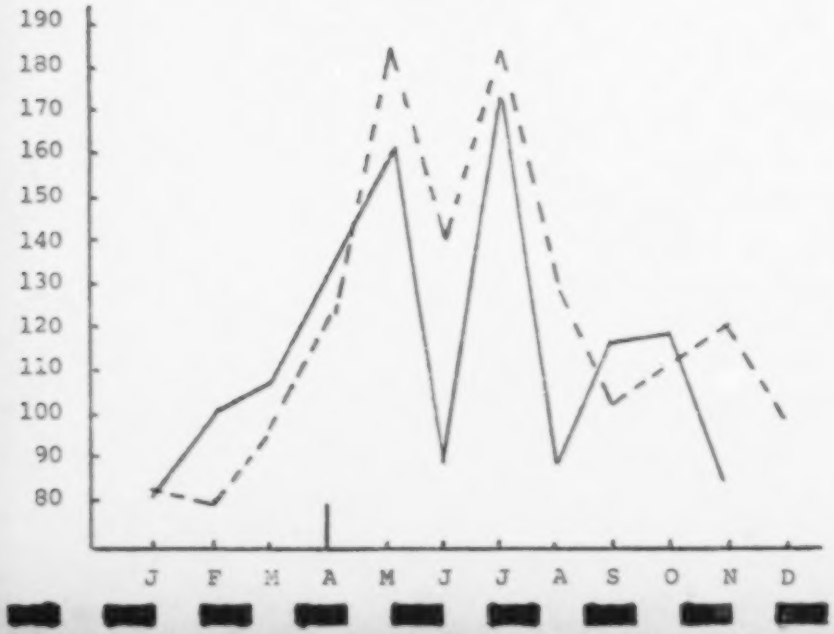
Multi-List appreciation continued its upward trend, and reached a 31.9 percent increase over fourth quarter, 1978 prices.

CHART 5A





NUMBER OF RESIDENTIAL SALES: 5-10 MILE RADIUS



NUMBER OF RESIDENTIAL SALES: 15-20 MILE RADIUS

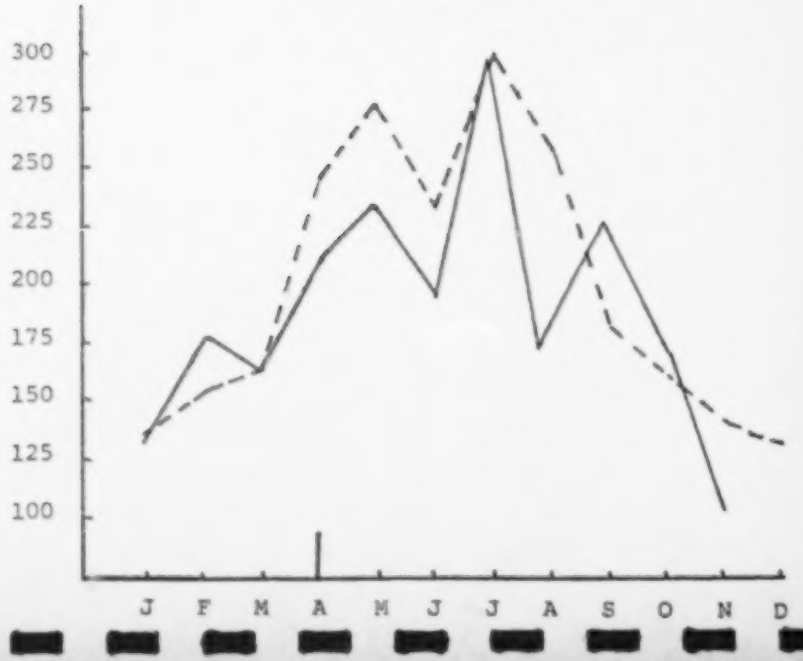
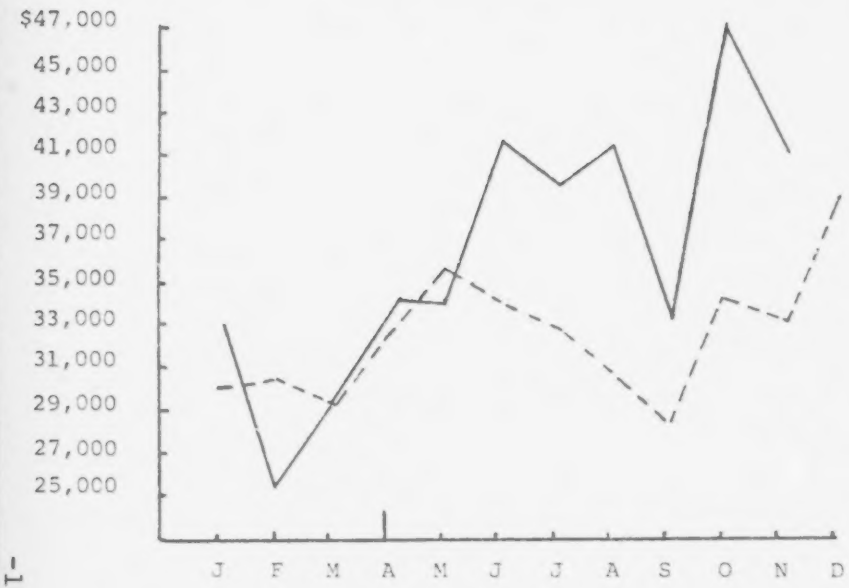
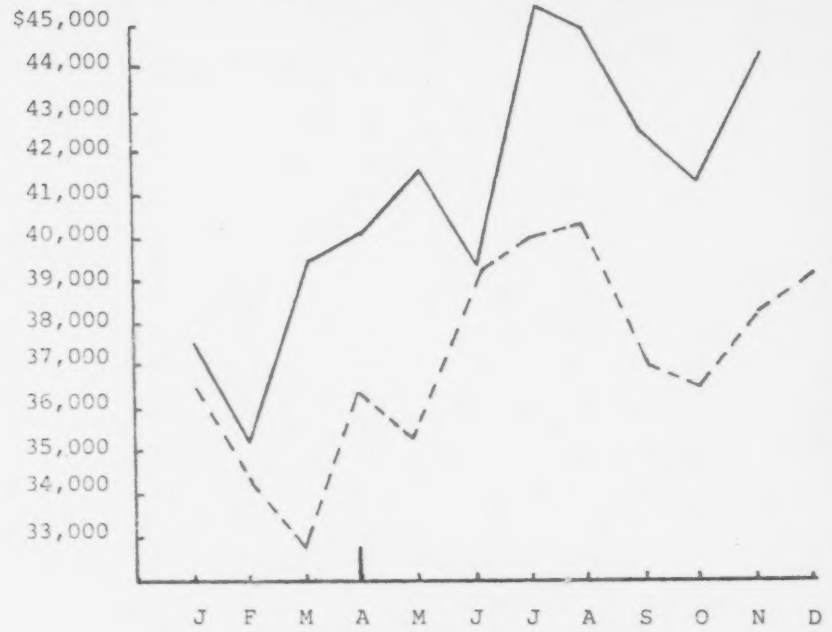


CHART 5B

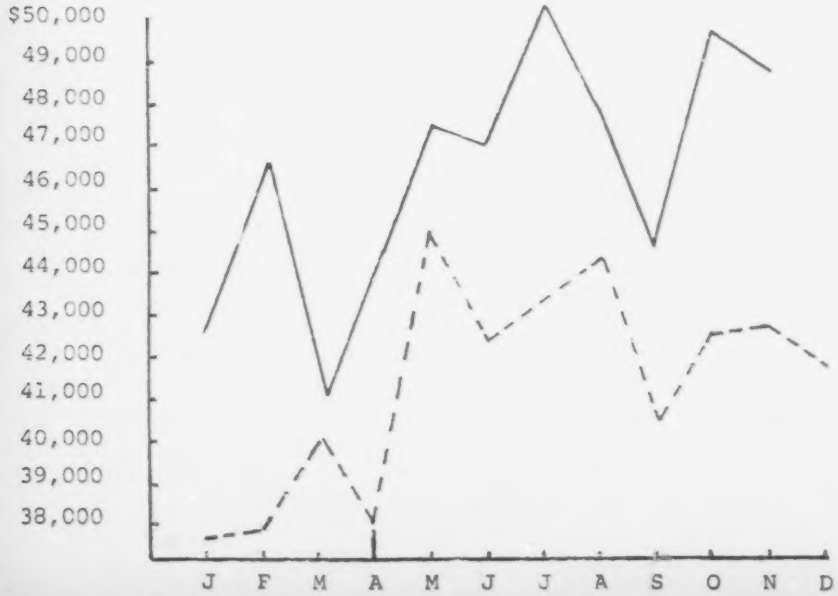
AVERAGE HOME SALE VALUE: 0-5 MILE RADIUS



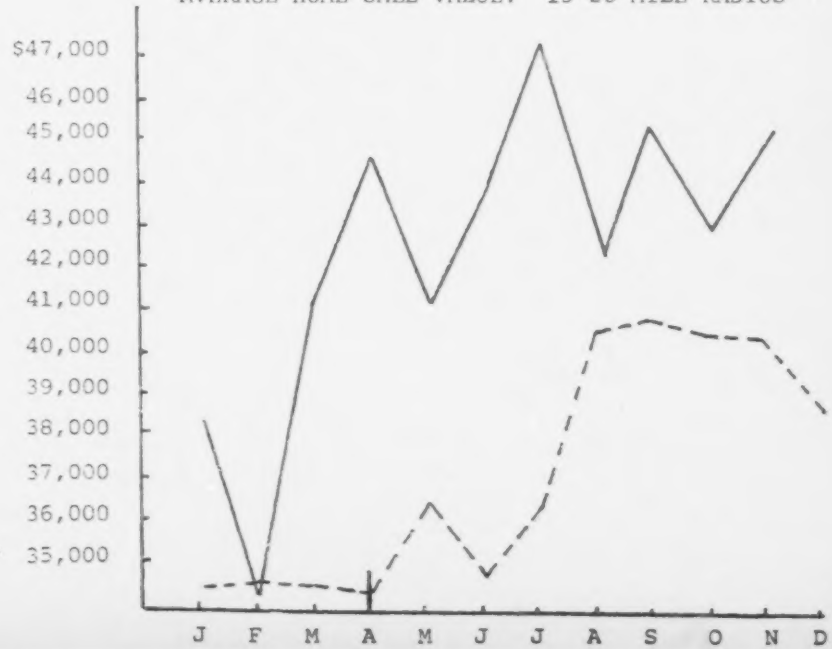
AVERAGE HOME SALE VALUE: 10-15 MILE RADIUS



AVERAGE HOME SALE VALUE: 5-10 MILE RADIUS



AVERAGE HOME SALE VALUE: 15-20 MILE RADIUS



Analysis: Overall, residential property values in 1979 for the quarters following the accident, according to both data sources, were above those registered in 1978. STEB data indicated a 10.8 percent increase over the previous year, while the Multi-List figure was somewhat higher at 13.2 percent.

The drop in May, 1979 probably reflected many sales contracted prior to the accident, since there is about a 60 to 90 day lag between a signed sales agreement and the final settlement. Therefore, this drop should not be considered a strong indicator of TMI influence.

5.1.6 Days on the Market in the Five Mile Radius

Only Multi-List data is available on this topic.

Second Quarter, 1979: Property in the five mile area remained on the market an average of 93.4 days, compared to the 1978 second quarter figure of 71.0 days. The difference is significant and represents a 31.5 percent increase.

Third Quarter, 1979: By the third quarter, days on the market were recorded at nine percent fewer days than for the same time period in 1978, or 59.6 days for 1979 and 65.5 for 1978.

Fourth Quarter, 1979: During this period, the number of days on the market rose by 26 percent to 84.4 days, compared with the same time in 1978. Property took only an average of 67 days to sell in 1978.

Analysis: Residential property remained on the market longer -- 15 percent longer -- than in 1978. The second quarter following the accident, when compared to the same period in 1978, showed the greatest increase; but in the third quarter, days on the market decreased significantly from the previous year. Although the fourth quarter shows an increase of days on the market, it was in line with the experience of the total 20 mile radius. Thus, the data suggest that any significant negative effect attributed to TMI in the five mile radius was short-lived and limited to the second quarter of 1979.

5.2 Real Estate Industry Perspective

Data from STEB and Multi-List sources was augmented by cataloging actual experiences and perceptions of area realtors. In November, 1979 the Pennsylvania Department of Community Affairs (DCA) collected data from 40 real estate agencies within a 20 mile radius of TMI. Thirty agencies were located

in the Harrisburg area, including Middletown and surrounding communities, and ten in the York area.

DCA's objective was to determine: resistance to buying houses in the 10 mile area following the accident; the extent to which buyers were backing out of sales agreements; and the accident's general effect on residential real estate business. Table 5D shows the results of DCA's data collection.

5.2.1 Resistance to Buying Houses

Twenty-five percent of the agencies reported experiences involving the refusal of buyers to look at property near TMI. In the two week period following the accident, 75 percent noticed a resistance to buying houses, and to placing property on the market.

5.2.2 Sales Agreement Cancellations

Twenty percent of the realtors reported that buyers called while the accident was occurring or immediately after conditions on the island had been stabilized, and expressed apprehensions, but ultimately did settle on property for which sales agreements had already been signed.

Only five realtors reported incidents where buyers actually backed out of sales agreements, and did not relocate in southcentral Pennsylvania. The number of buyers backing out of sales agreements is not significant, since 800 residential closing sales were recorded for the 20 mile area in April, 1979.

5.2.3 Business Effects

Eighty-seven percent of the agencies experienced a negative effect on their business during the first few days following the accident. Many real estate offices were closed, and appointments to show property were cancelled. For about a month following the accident, five percent of the realtors did not solicit listings in the TMI area to avoid fostering panic.

All realtors reported that after the March 28, 1979 accident, business was "off" for the remainder of the year. But 90 percent of the realtors agreed that the tight mortgage money market of 1979 was more damaging to their business than TMI. Five percent attribute the slow-down of business between

Table 5 D

POST ACCIDENT REALTOR EXPERIENCES
IN GREATER HARRISBURG AREA

Impacts on Residential Real Estate	Time Frame	Real Estate Agencies Affected* Number	%
Buyer refused to look at residential property near TMI	N/A	10	25
Buyers "backing out" of contracts (12 incidences)	N/A	N/A	N/A
Resistance to property sales and listings	Two weeks immediately following the accident	30	75
Detrimental business effect	Several days past accident	35	87
Detrimental business effect	Immediately after accident to November, 1979	5	13
Mortgage money market conditions more damaging than TMI	Immediately after accident to November, 1979	36	90

NA: Not available

* Forty agencies in sample.

SOURCE: Pennsylvania Department of Community Affairs, November, 1979.

March 28, 1979 and November, 1979 to TMI. Two agencies indicated that because of the accident, they borrowed money so they could continue to stay in business.

The recourse for real estate agencies who felt that their business was directly affected by the accident was to either apply for a Small Business Administration loan, or present a case for loss to Metropolitan Edison's insurers.

Analysis: Neither the number of reported sales agreement cancellations nor the opinions of the majority of realtors questioned indicated that a significant adverse impact was produced by the accident on the real estate market in 1979.

5.3 Residential Mortgage Activity

To expand the base from which conclusions may be drawn about the impact of the accident on residential real estate during 1979, activities for several categories of mortgages and loans in middle and low income areas were investigated by the Pennsylvania Department of Community Affairs. These loan categories included conventional, VA, FHA, and those for multi-family dwellings and home improvements. The number of loans and total dollar amount for each category were compared with levels recorded in 1978. Low income tracts, which are often the first to experience a withdrawal of mortgage funds after a blow to investment potential occurs, were surveyed in the five and ten mile radius to determine if the accident caused any negative impacts.

5.3.1 Conventional Mortgages

Within 20 Mile Radius: For the total 20 mile radius, both the number of conventional loans made and the total loan amount dropped in 1979 from 1978 levels, the number of loans by 18 percent and the total dollar amount by 15 percent. No discernible pattern of relationship between the distance from TMI and the degree of decline emerged.

Low Income Areas: Compared with middle income areas, dollar amounts in low income tracts located within two towns in the five mile radius -- Steelton and Middletown -- were 78 percent to 40 percent below 1978 levels.

Figures for two other low income areas located within ten miles of TMI in York and Harrisburg showed two different patterns. Total conventional mortgage dollars increased substantially in the Harrisburg tract, but declined by 17 percent in a similar York tract.

5.3.2 VA and FHA Mortgages

Total 20 Mile Radius: In 1979, the number of VA and FHA insured mortgages remained at 1978 levels while dollar amounts increased by 25 percent, probably due to increased property appreciation. Increases in dollar amounts were recorded within the ten, 15 and 20 mile radii. Outside the 20 mile radius, declines occurred in both the number of these loans and in total dollar amounts.

Five Mile Radius: A drop of seven percent occurred for dollar amounts, but as in the other radii, the number of loans remained constant.

Low Income Areas: Low income tracts targeted in York and Harrisburg, as well as those in the five mile radius, increased in both dollar amounts and number of loans. York's dollar amounts were up 60 percent, while the number of loans increased by 25 percent. The Harrisburg tract had a sum increase of 79 percent.

Analysis: These figures appear to indicate that TMI had no significant effect on either the volume of low income tract VA and FHA mortgages, or on the volume of these loans for a total 20 mile area, or on the five mile radius.

5.3.3 Multi-Family Dwelling Mortgages

Total 20 Mile Radius: During 1979, the total number of mortgage loans for multi-family dwellings declined by 67 percent compared with 1978. Total dollar amounts were off by 84 percent. Numbers were too small to determine the declines between radii.

Low Income Areas: Low income tracts generally experienced a slight negative change in the number of mortgages granted, and total dollar amounts loaned for multi-family dwellings. The exception were tracts ten miles away from TMI in York, which showed an increase in both loans and dollar amounts.

Analysis: The slight decline of activity in low income tracts does not seem to stem from TMI, since distance from TMI does not appear to affect the level of loan activity. During a tight money market, as was the case in 1979, loans for multi-family dwelling units can be expected to decline because they represent a more speculative investment for lending institutions. There is no evidence that the substantial decline in the total 20 mile radius was precipitated by the accident but, as with the low income tracts, was probably a reflection of economic conditions.

5.3.4 Home Improvement Loans

Total 20 Mile Radius: Both the number and the dollar amount of these loans declined by about the same percent in 1979. The number of loans was down by 16 percent, and dollar amounts by 15 percent.

Analysis of the data revealed no direct relationship between the decline and the distance of the radii from TMI.

5.4 Rental Vacancies

Unit rentals are another component of housing in southcentral Pennsylvania. Private property managers of rental complexes, as well as local county housing authorities, were contacted by the Pennsylvania Department of Community Affairs to determine whether the TMI accident affected their rental market.

5.4.1 Privately Owned Units

Data collected from privately owned units covered the period between March 28, 1979 through March, 1980. Following the accident, no change in the number of vacancies was noted by managers of rental complexes in the five and ten mile radii. A beneficial effect resulted due to the influx into the area of 16,000 workers involved in clean-up operations related to the accident. Most of these workers located in the five mile radius.

In the 15 mile radius, a few managers reported that TMI produced a negative and continuing effect on vacancy levels, but this was balanced by the same number who reported a positive effect resulting from people moving away from "close-in" TMI locations and relocating in the 15 mile ring. Further out in the 20 mile radius, a few managers noted a negative effect immediately following the accident. All managers contacted in this radius indicated that by the spring of 1980, any negative impact of TMI on their rental market had abated.

5.4.2 Housing Authority Units

County housing authorities responsible for operating units for the low income and the elderly were interviewed by Pennsylvania's Department of Community Affairs.

The distribution of these units is displayed in Table 5E.

In all radii the ratio of vacancies to total units has generally increased since 1977, and by substantial amounts, espe-

cially in the five and ten mile radii. During 1979, vacancies were running at 20 percent in the five mile radius, and 18 percent in the ten mile ring. Housing authority units located in the 15 mile radius in 1979 had the least vacancies for all radii with an eight percent vacancy-to-rental unit ratio. A similar pattern to the five and ten mile radii occurred in the 20 mile area, but at a slightly lower percentage.

Despite the 14 percent vacancy rate in the total 20 mile area (see Table 5F) during 1979, it was the opinion of all housing authority officials interviewed that TMI was not a factor in that year's vacancy patterns. Other conditions, ranging from a large number of the elderly moving into new federally-funded housing, to higher ceiling rents, were probably responsible for the increased vacancy rate.

Analysis: Available rental vacancy data does not support a finding of negative TMI impact on unit vacancies. Only for private sector units did managers report a minor adverse impact immediately subsequent to the accident, but this impact was short-lived. Housing authority rental vacancies might have been expected to increase in the five mile radius because of close proximity to TMI, but vacancy increases in this area were not significantly larger than the pattern for further out locations in the ten and 20 mile radius.

5.5 New Construction Starts and Related Employment

New construction starts and related employment are often used as a barometer for the housing market. These two factors were examined to ascertain whether the TMI accident impacted construction activity during the last three quarters of 1979. A comparison was made between 1978 and 1979 levels for both residential and commercial/industrial starts, and contract construction employment by the Pennsylvania Department of Community Affairs in the six counties ringing TMI (Cumberland, Dauphin, Lancaster, Lebanon, Perry and York). (See Tables 5G and 5H.)

5.5.1 New Construction Starts

Second Quarter, 1979:

Residential Starts: During the first three months following the accident (April, May, and June, 1979), the six counties surrounding TMI out-performed the rest of the state in construction starts. Although a number of new starts for the six county area decreased in April by four percent from the

Table 5 E

HOUSING AUTHORITY UNITS IN THE 20 MILE RADIUS

Radius	No. of Units	Location	Manager
0-5 Miles	93	Middletown	Dauphin County
5-10 Miles	521	Swatara Steelton Highspire	Dauphin County
10-15 Miles	693 104	York City York City	City of York York Area Development Corp.
15-20 Miles	320	Lebanon City	Lebanon County
TOTAL	1,731		

SOURCE: Pennsylvania Department of Community Affairs.

Table 5 F

HOUSING AUTHORITY VACANCIES

Radius	Units vacant in 1977	Ratio vacancies to total units 1977	Units vacant in 1978	Ratio vacancies to total units 1978	Units vacant in 1979	Ratio vacancies to total units 1979
5 Miles	13	14%	16	17%	19	20%
10 Miles	65	12%	78	15%	92	18%
15 Miles	56	7%	67	8%	65	8%
20 Miles	46	14%	54	17%	60	19%
TOTAL	180	10%	215	12%	236	14%

SOURCE: Capital Regional Planning and Development Agency.

Table 5 G

NEW RESIDENTIAL CONSTRUCTION STARTS
IN 1979 FOLLOWING TMI ACCIDENT

1979 Quarters	Total Units	% Change from 1978	Total Value ($1,000)	% Change from 1978
Second Quarter				
Six County TMI Area	2,465	9.5	94,488	22.6
Rest of Pa.	9,223	-19.5	462,505	-14.0
Third Quarter				
Six County TMI Area	1,643	-20.4	69,636	- 6.7
Rest of Pa.	9,078	-18.1	506,083	- 3.2
Fourth Quarter				
Six County TMI Area	1,228	-22.2	56,231	- 3.6
Rest of Pa.	6,510	-28.9	330,177	-24.6
Total for the Three Quarters				
Six County TMI Area	5,336	- 9.5	220,355	4.9
Rest of Pa.	24,811	-21.7	1,298,765	-13.3

SOURCE: Pennsylvania Department of Community Affairs, F.W. Dodge Reports.

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SOURCE: Pennsylvania Department of Community Affairs, F.W. Dodge Reports.

Table 5 H

NEW COMMERCIAL AND INDUSTRIAL CONSTRUCTION STARTS
IN 1979 FOLLOWING TMI ACCIDENT

1979 Quarters	Total Units	% Change from 1978	Total Value ($1,000)	% Change from 1978
Second Quarter				
Six County TMI Area	107	24.4	30,864	61.7
Rest of Pa.	663	-18.6	380,540	-15.7
Third Quarter				
Six County TMI Area	113	121.6	27,222	124.5
Rest of Pa.	629	-13.4	334,031	9.0
Fourth Quarter				
Six County TMI Area	90	38.5	32,970	-3.4
Rest of Pa.	685	9.1	319,138	2.5
Total for the Three Quarters				
Six County TMI Area	310	53.5	91,056	39.4
Rest of Pa.	1,977	-8.8	1,033,709	-3.3

SOURCE: Pennsylvania Department of Community Affairs, F.W. Dodge Reports.

previous year, the rest of the state was down by 51 percent. Dollar volume of starts for April was calculated at an 11 percent increase in the six county area, and a 32 percent decrease for the balance of the state.

In May and June the study area experienced a six percent and 24 percent gain respectively in number of residential units started, while starts in the rest of the state showed no increase in May and a five percent increase in June. Dollar volume for these two months showed a similar pattern -- a gain in the six county area of 21 percent for May and 35 percent for June, and a drop in dollar volume for both months in the rest of the state. May declined by ten percent, and June by four percent.

Commercial and Industrial Starts: Business construction starts held up better to the overall economic downturn and possible TMI effects than those for the residential sector. In the second quarter of 1979 following the accident, the number of new commercial/industrial units increased by 24 percent and the dollars expended climbed by 62 percent from 1978 for the six county TMI area. The rest of Pennsylvania declined by 19 percent and 16 percent for number of units and dollars respectively.

Although starts were up in April and May, June showed a slight decline from the previous year in the six county area. This dip could be attributable to TMI. Dollars spent for new construction starts in the six counties were up considerably for every month as compared to 1978. The rest of Pennsylvania, however, dropped in every month of the quarter from the previous year for number of starts, yet was making some recovery as the declines reversed to increases for dollar amounts in May and June.

Third Quarter, 1979:

Residential Starts: If a decrease in residential construction start activity in the six county area occurred because of TMI, this effect should have begun to manifest itself by July, 1979, after builders and lending institutions had time to assess loss of demand and investment risk attributed to the accident.

July data for this area indicates that a drop in the number of residential starts did occur -- 30 percent fewer units than 1978. The remainder of the state was down by only 17 percent. Dollar volume was also lower for the study area, a decline of ten percent below the level of 1978. The balance of the state declined by 11 percent.

By August, 1979, the six county area appeared to have climbed out of the July slump and out-performed the rest of the state in number of units and dollar volume. In September, performance for both the six county area and the remainder of the state was about equal.

Commercial and Industrial: In the third quarter of 1979, the commercial/industrial sector of the TMI study area made substantial gains in new construction starts, both in number of units and dollars spent -- 122 percent and 125 percent, respectively. The rest of the state improved somewhat from the previous quarter, but still showed a decline in number of units compared to the previous year.

The highest monthly increase for this quarter in the six county TMI area occurred in July, both in number of units and dollars expended. The rest of Pennsylvania fared the best in this month as well, under both categories, by experiencing no decline in units and an eight percent increase in dollar levels compared to 1978.

Fourth Quarter, 1979:

Residential: A seesaw effect emerged during October, November and December between the study area and the performance of the rest of the state. In October, the TMI area was down by one percent in number of residential units and up 18 percent in dollar volume, again out-performing the rest of the state; but by November, the six county area dropped slightly below state levels for both categories. By December, the study area had regained its lead.

Commercial and Industrial: Fourth quarter, 1979 reflects a seasonal decline in the construction market. Although the number of units were up by a healthy 39 percent in the six county TMI area, total dollars declined three percent. The rest of Pennsylvania registered a modest gain of nine percent and three percent for units and dollars respectively.

October was the most active month in the fourth quarter in terms of new commercial and industrial starts. However, the level of activity was below that for 1978 in both the TMI area and the rest of Pennsylvania. The tightening mortgage money market was probably responsible for the smaller amount of activity in 1979 when compared to the previous year.

Analysis: The nine month period following the TMI accident was marked by fewer new residential construction starts within the six county area than was the case in 1978. But this relative decline was much greater in the rest of Penn-

sylvania. There appears to be no effect that might be attributed to TMI on new residential construction starts, with the single exception of July, 1979. The July experience in the TMI area resulted in a third quarter record for 1979 being slightly worse for the TMI area than the rest of the state when compared to 1978.

The commercial/industrial sector fared better than its residential counterpart in number of units and dollars spent for all the 1979 quarters examined. In all three quarters, commercial/industrial starts for the six counties were considerably ahead of the rest of the state. If TMI impacted the commercial/industrial sector in 1979, its influence was negligible compared to overall gains for that year.

5.5.2 Contract Construction Employment

To analyze the effects of the TMI nuclear accident on the construction industry in southcentral Pennsylvania, 1979 data for contract construction employment was compared with 1978 levels. Labor market areas covered by the data encompassed the seven county area surrounding Three Mile Island (Adams, Cumberland, Dauphin, Lancaster, Lebanon, Perry and York). The TMI area was then compared against Allentown-Bethlehem-Easton, an area which is outside the seven counties, and with the state as a whole. (See Table 5I.)

During the first quarter of 1979, the percentage of contract construction employment increased for all areas. In the Allentown-Bethlehem-Easton area, employment increased the least, only 2.2 percent, while the seven county TMI area and the state as a whole paralleled each other with a 7.9 and an 8.2 increase respectively over 1978 employment levels.

Spring is traditionally a period of increased construction activity, but in the second quarter of 1979 Harrisburg and Allentown-Bethlehem-Easton declined below second quarter 1978 levels. June showed the greatest decrease in construction employment. However, since both areas declined in June, TMI could not have been the only contributing factor. Harrisburg's second quarter decline of 10.3 percent compared to the previous year was steeper than the 0.7 decrease for the entire TMI area, or for Allentown-Bethlehem-Easton's 6.2 percent decrease. This fact would seem to indicate a possible negative impact on construction in the greater Harrisburg area which includes sections of the five and ten mile radii from the island. Other areas examined, including Lancaster, York and Lebanon Counties, all showed modest gains, indicating that TMI was not a negative pervasive influence throughout the seven county area.

Table 5 I

CONTRACT CONSTRUCTION EMPLOYMENT
(in thousands)

Labor Market Area	1st Qtr. 1979	% Change from 1978	2nd Qtr. 1979	% Change from 1978	3rd Qtr. 1979	% Change from 1978	4th Qtr. 1979	% Change from 1978	Year Total	% Change from 1978
Harrisburg	23.1	5.5	26.1	-10.3	27.7	-14.2	26.6	-8.3	103.5	-7.6
Lancaster	19.1	11.7	21.4	5.4	23.0	3.1	22.7	8.1	86.2	6.8
York	22.2	8.8	24.6	4.7	25.8	0	24.8	0.8	97.4	3.3
Lebanon	3.8	0	4.3	4.9	4.4	0	3.9	-4.9	16.4	0
7-County Area	68.2	7.9	76.4	-0.7	80.9	-4.6	78.0	-0.9	303.5	0
Allentown Bethlehem Easton	23.4	2.2	27.2	-6.2	28.0	-13	27.6	-7.7	106.2	-6.8
Pennsylvania	509.2	8.2	626.0	2.9	679.5	1.1	654.8	2.9	2469.5	3.4

SOURCE: Pennsylvania Department of Community Affairs.

By the third quarter of 1979, the area under consideration either sustained construction employment losses, or showed insignificant gains from the previous year. Market conditions of decreasing funds and higher interest rates were most likely responsible. The Harrisburg area's 14 percent decline was paralleled by the 13 percent drop in Allentown-Bethlehem-Easton.

The fourth quarter of 1979 showed an increased level of employment from the previous quarter. Harrisburg and Allentown-Bethlehem-Easton's decline from 1978 paralleled each other, and both were less than the previous quarter reduction. Construction employment in the seven county area was also faring better, although still displaying a slight decline. Lancaster, York, and the state as a whole made modest increases.

Analysis: Overall for 1979, the Harrisburg area showed a 7.8 percent decrease in construction employment from the previous year, corresponding to the Allentown-Bethlehem-Easton area's 6.8 percent decline. The other areas either held their own or made some increase, as did the state as a whole, with a 3.4 percent gain. Since the quarterly trend of downturns and upswings tended to reverberate throughout the areas studied, broader economic ills rather than TMI were probably responsible for the changes experienced.

Although new residential construction starts decreased somewhat in 1979, the decline probably did not precipitate a fall-off of construction employment. Commercial and industrial new construction starts generally increased so that workers laid off in the residential sector were probably picked up by large business construction.

5.6 Builder Expectations

How did the accident affect plans of builders in the south-central area of Pennsylvania? The Pennsylvania Department of Community Affairs conducted a study of builder expectations for this area in September, 1979. This effort found that about 17 percent of the builders perceived an impact on construction activity from TMI within the five mile radius. Approximately 33 percent of the builders either gave economic reasons for not building within the 20 mile radius of TMI, inclusive of the five mile ring, or while they would build, did not feel business would be good. Their perception of why business would not be good was tied to the unavailability of, and high interest rates for, construction money.

Analysis: These findings suggest that, even though the condition of the economy might depress building activity in the

Three Mile Island area, the potential for a reduction in new construction investment due to TMI was present. However, given the date of this survey and actual performance levels since September, 1979, these expectations do not appear to have materialized.

5.7 Household Dislocation

Did people living in areas surrounding TMI permanently relocate because of the accident? To answer this question, several indicators of dislocation, including school enrollment, surveys, and municipal electric hook-ups were examined by the Pennsylvania Department of Community Affairs.

5.7.1 School Enrollment

School enrollment for the total 20 mile area since the fall of 1977 has generally experienced a steady, but minor decline.

Total 20 Mile Radius: In the fall of 1979, enrollment decreased by 3.5 percent over 1978 levels, and compared similarly to a 3.8 percent statewide decrease.

Five Mile Radius: A 0.5 percent decrease occurred between fall, 1978 and fall, 1979.

Ten Mile Radius: No worsening decline was registered in this radius except for Derry Township.

Fifteen Mile Radius: More school districts showed patterns of worsening enrollment declines than increases or maintenance of the status quo.

Twenty Mile Radius: Increased enrollment and status quo maintenance occurred in more school districts than did decreases.

Analysis: It seems unlikely that TMI was responsible for disruptions and declines in school enrollment since no consistent pattern of worsening decline in all radii from 1978 to 1979 is evident. There appears to be no relationship between distance from TMI and decreasing school enrollments.

5.7.2 Surveys Identifying Household Dislocation

Several surveys have been conducted under the auspices of other agencies not connected with this study. These are the findings:

Pennsylvania Department of Health: This agency has completed a census of all persons living within a five mile radius of the plant as part of a long-term health surveillance project. In updating the census, the Health Department identified several hundred persons who had moved out of the five mile radius between the summer of 1979 and the spring of 1980. Preliminary analyses indicate, however, that this level of movement is at a rate which can be expected anywhere in the United States. The Health Department expects to continually update this census and has plans to determine what percentage of those who moved did so primarily because of the accident.

Mountain West Research, Inc.: The survey conducted by Mountain West for the U. S. Nuclear Regulatory Commission resulted in these findings: Nineteen percent of the respondents had considered moving because of TMI (those living closest to TMI were the most likely to give this response); those who evacuated during the Governor's advisory were more than three times as likely to consider moving than non-evacuees; of those who had considered moving, 22 percent had made definite plans to move. Thus, 4.2 percent of the families wtihin 20 miles of TMI indicated that they had definitely decided to move because of TMI by early August, 1979.

5.7.3 Municipal Electric Hook-Ups

Changes in municipal electric hook-ups can be indicative of in- or out-migration trends for an area. The data revealed no pattern of decreases or leveling off of new hook-ups in the months following TMI, when compared to the same time in 1978.

Analysis: The indicators examined for possible TMI-induced dislocation show no significant population declines. School districts within a 20 mile radius displayed both increasing and decreasing enrollments without regard for proximity to TMI. Other research efforts have found that fewer than one percent of the households in the five mile radius had definitely decided to move because of TMI. Mountain West Research indicates that approximately four percent of the total 20 mile radius population, mainly those most affected by evacuation and proximity to TMI, have made concrete moving plans. In-migration, as depicted by municipal electric hook-ups, shows no downward trend in the aftermath of TMI. Based or the current inforamtion available, the effect of TMI on household dislocation has been minor.

6.0 AGRICULTURE

The overall economic impact of the accident on the farm community was short-lived and relatively minor. Public concern over the safety of milk and other foodstuffs was quickly dispelled by pronouncements of results of monitoring which showed no harmful radiation to be present.

At the time of the accident, the primary public apprehension revolved around the possible level of radiation present in milk and other farm commodities. Extensive monitoring of milk samples for Iodine-131 just following the accident by the Pennsylvania Department of Agriculture revealed only minute levels of radiation well below those which would require regulatory action to protect the health of consumers. Continued milk sampling since May 4, 1979, has found no detectable contamination. Investigations have also failed to prove any relationship between the TMI accident and livestock or plant health in the area surrounding the plant.

Overall, the farm community reported minimal losses due to TMI. In response to a Pennsylvania Department of Agriculture study undertaken in the summer of 1979, 96 percent of 304 farmers located within the 25 mile radius of the plant reported no TMI-related economic losses. Those losses which did occur were mostly sustained during and immediately following the accident. They were mainly incurred by farmers who sold perishable commodities directly to consumers, rather than farmers who sold their commodities to processors or handlers.

A second study undertaken by the Department in October, 1979 of farmers selling directly to consumers indicated that some farmers located within 15 miles of the TMI plant sustained lost sales due to the TMI incident. These lost sales were almost wholly experienced by farmers who produce and sell milk on their farms. Although their greatest loss in milk sales occurred during the first four to five weeks following the accident, sales by October, 1979 were still lingering about ten percent behind 1978 levels.

The total economic loss to the farm community directly attributed to the TMI incident has been estimated at between one-quarter and one-half million dollars.

6.1 Immediate Impacts

6.1.1 Emergency Period Concerns

Concern surfaced during the immediate period about the safety of milk and fresh vegetables sold in the area. For example,

within the 20 mile radius, two large firms stopped buying local milk during the month of April. During the first days after the accident, many food retailers in the TMI area felt it necessary to inform the public that their milk for sale came from farms located out of the TMI vicinity.

In areas outside of Pennsylvania, for instance, Washington, D.C. and Maryland supermarkets, some retailers advertised that their milk did not come from the Commonwealth. There was also resistance to purchasing TMI area milk by some out-of-state dairies, and cases existed where orders were cancelled for Pennsylvania milk.

Dairies in the TMI area experienced declines in sales to varying degrees. A major dairy serving the Harrisburg metropolitan area found that sales dropped 18 percent during the first week after the incident and this was followed by a subsequent 15 percent decline during the second week. This dairy felt it necessary to advertise in the local newspapers that they did not utilize milk received from farms within a ten mile radius of TMI and, in fact, had disposed of milk from within that radius. Dairies in the York, Lebanon and Lancaster areas also experienced declines in sales, but to a lesser degree and for a shorter period of time.

The loss in sales of milk and other farm products was not solely due to a consumer fear over its consumption or use. The evacuation of an estimated 144,000 persons within a 15 mile radius of the plant also had a significant impact on retail sales. In addition, public schools, a major market for milk, were closed throughout much of the 20 mile impact area for several days. Many restaurants were also closed due to a lack of employees and customers, and this further reduced demand for certain foodstuffs.

6.1.2 Radiation Testing

Immediately following the March 28, 1979 initial radiation releases at TMI, the Pennsylvania Department of Agriculture began to take milk samples from farms and dairies within a 45 mile radius of the plant. The samples were analyzed by the Department of Environmental Resources for Iodine-131, a substance which, if received in substantial amounts, is a contributor to thyroid cancer. In addition, tests for other radioactive elements such as Xenon, Krypton and Cesium were carried out.

The level of Iodine radiation is measured in picocuries per liter. A picocurie is one-trillionth (10^{-12}) of a curie or a rem. Pennsylvania's health standard for milk allows 1,000

picocuries per liter; the federal Food and Drug Administration's allowable level is 12,000 picocuries per liter. At such levels, regulatory measures would be needed to protect the public health and safety. Such measures were not necessary due to the TMI accident.

Between March 29 and April 21, 1979, the Pennsylvania Department of Agriculture took 200 milk samples. The highest reading found in any of these samples was 29 picocuries of Iodine-131 per liter. After May 4, 1979, continued testing of milk, essentially in a 25 mile radius, has shown less than ten picocuries per liter. This level is below the minimum detectable with the equipment being used. For practical purposes, a reading of less than ten picocuries is considered to be zero, and thus milk from the TMI area was determined to be safe for consumption.

During the first three weeks in April of 1979, over 30 different food items were sampled within a 30 mile radius of TMI. This sampling also included river water, well water, and tap water. No additional testing of these specific food items took place after April 24, 1979, since prior results did not merit further testing. However, on June 6 of that year, samples of fresh lettuce, radishes, rhubarb, spring onions and fresh strawberries grown within a seven mile radius of TMI were also tested and were found to be free of radioactive content.

6.1.3 Sales Picture to Normal Levels

While consumer and buyer resistance appeared immediately after the accident, it was relatively short-lived. Once the evacuees returned to the area, by April 10, 1979, the sales and consumption of farm products returned to near normal levels. This was due to a number of factors. Of paramount importance was the fact that the state released to the public the early results of the radiation testing of milk and other foodstuffs. The low radiation levels found in these tests helped to overcome public apprehension. In addition, the publicized fact that livestock, at the time of the accident, were feeding on stored grain and not pasture also had a reassuring effect. A third factor was the comparison of the TMI accident radiation levels with those resulting from the Chinese nuclear explosion fallout of 1976 and 1977. At that time, radiation levels found in raw milk reached nearly 500 picocuries per liter but were not considered to be a significant health threat. When the public became aware of these factors, resistance to consumption of local products greatly diminished.

6.2 Impact on Farmers

6.2.1 Economic Losses Insignificant

A study of six percent of the estimated total number of farmers within 25 miles of TMI indicated only minimal losses. Ninety-six percent reported no losses due to TMI, according to a Pennsylvania Department of Agriculture study conducted in the summer of 1979. Reported losses ranged from $25 to several thousand dollars per farm, and took such forms as loss in milk sales, cancellation of orders, and expressions that business levels were below those of 1978. Furthermore, at the time the data was collected during the summer of 1979, there were only three percent reporting any continued losses. A greater share (ten percent) of the fruit and vegetable farmers reported such continued losses. (See Table 6A.) This study indicated that losses were mainly being incurred by farmers selling perishable commodities directly to consumers, and hence feeling the effects of direct consumer resistance.

A larger share of the farmers in the ten mile radius reported they had experienced losses, and continued to do so, than farmers in the 11 to 25 mile radius.

The study also indicated that consumer resistance to the buying of agricultural products was reported by only five percent of the farmers, but was markedly higher (13 percent) among farmers within the ten mile radius of TMI than those beyond. Most of the resistance occurred in the period immediately following the accident. The Department's study indicated that some customers failed to purchase products while others needed to be convinced of the products' safety before purchasing. In spite of the declared safety for consumption, there was a small segment of the buying population which remained cautious and concerned over possible radiation effects on food. In addition, this small consumer resistance became quickly compounded by other factors such as the shortage of gasoline, changes in buying habits of the consumer, and decline of the family's buying power due to inflation which soon affected the purchase of locally produced commodities.

6.2.2 Direct Marketers Affected

A second study conducted by the Department of Agriculture in October, 1979 confirmed that farmers selling commodities directly to consumers were more susceptible to financial losses than those selling to a processor or food handler. Groups examined included milk juggers (farmers who produce and sell milk on their farms) and those who raise fruit, vegetables and

Table 6 A

FARMER RESPONDENTS - TMI IMPACT STUDY
SUMMER 1979

	Within 10 Miles	11-25 Miles	Total
Universe of Estimated # of Farms[1/]	700	4,300	5,000
Estimated Land Acreage[1/]	95,000	555,000	650,000
Number of Farmers Responding			
Dairy	7	110	117
Livestock & Poultry	14	105	119
Fruit & Vegetables	7	39	46
Grain	5	17	22
TOTAL	33	271	304
Sample Size (%)	4.7	6.3	6.0
Respondent's Land Acreage	8,319	52,367	60,686
% of Land Acreage Covered by Sample	8.8	9.4	9.3

1/ Estimates based upon the 1978 Crop and Livestock Summary and the 1974 U.S. Agricultural Census. A proportionate share of the county's total equal to an approximate percentage of land area within the given radius from Three Mile Island was utilized to arrive at the estimates.

SOURCE: Pennsylvania Department of Agriculture.

other produce and sell at roadside stands and farmer's markets. The Department of Agriculture contacted 100 farmers living within 25 miles of TMI who sell their products directly to the consumer.

The findings revealed that of the 37 respondents, only 14, or about one-third, experienced a decrease in sales during 1979 as compared to previous years. But only five of the farmers who had a decrease blamed TMI as the culprit. Therefore, only 13 percent of the farmers selling directly to consumers felt TMI was an important reason for their financial losses in 1979.

The study of farmers conducted in the summer of 1979 showed that only four percent claimed they had losses due to the accident. The 13 percent with TMI-related losses determined in October confirmed the suspicion that farmers dealing directly with the public suffered the greatest distress from the TMI event. In the October study, proximity to TMI played a key role for farmers experiencing decreases in sales because of the accident, since all of them were located within 15 miles of the plant and 60 percent were within ten miles. Additionally, four of the five farmers were milk juggers.

The decrease in sales experienced by those affected by the accident primarily occurred during the first four to five weeks following the event; however, the juggers reported in October, 1979 that their sales were still lingering behind those of 1978 by about ten percent. Fresh produce was not in season when the TMI accident occurred at the end of March, 1979, and very little locally grown fresh produce was available until June, with the bulk being harvested in the late summer and early fall.

The distributional pattern of the universe and sample of the milk juggers and fresh produce farmers are listed below:

Number of Farmers in Universe

Milk Juggers	25
Fresh Produce Farmers	75

Number of Farmers Responding

Milk Juggers	13
Fresh Produce Farmers	24

The four milk juggers who reported their sales down for 1979 due to TMI sustained losses amounting to about $60,000. As shown by the list above, the sample of juggers responding was

50 percent of the total number possible. Therefore, it could be reasonably estimated that total loss to milk juggers in the study area would approach $125,000.

Milk juggers sell to consumers the whole year, and their sales are normally relatively uniform throughout. Thus, any increases or decreases are easily noticed. In addition, the news media coverage of the Iodine-131 content found in milk immediately after the accident made the consumer aware of a possible danger, real or perceived, and contributed to consumer resistance to the product. To those milk juggers located within about ten miles of Three Mile Island, the consumer resistance appears to have played a very important role in decreased milk sales, especially in the initial period following the incident.

While TMI had an impact on farmers' sales to the consumer, it was not the paramount reason for the decrease in sales when compared to prior years. Factors relating to the price and availability of gasoline were more often noted as the key reason. Table 6B shows the reasons identified as causing a decrease or lack of an increase in sales. Many of the respondents indicated more than a single reason for their failure to achieve increases in sales over previous years.

It should be pointed out that the five farmers who had decreases due to TMI only listed TMI as the cause of their problem. Since a total of 14 had decreases in sales with five solely related to TMI, the remaining nine farmers stated seven other reasons to explain their financial problems. Those farmers who mentioned tourism declines as a factor may be reflecting declines associated with either the gasoline crisis or the crisis at TMI.

The information collected from both studies and subsequent observation of various marketing data by the Pennsylvania Department of Agriculture provides a basis for an estimate of the total economic loss incurred by farmers as a result of the Three Mile Island accident. A reasonable estimate of this loss is between $250,000 and $500,000.

6.3 Continuing Concerns

6.3.1 Continued Radiation Testing

Monitoring by the Department of Agriculture of milk produced on farms in the vicinity of Three Mile Island continued until March 17, 1980. Since June 15, 1979, this monitoring had in-

Table 6 B

REASONS FOR DECREASED OR UNCHANGED SALES
1979 COMPARED TO PRIOR YEARS

Reasons	Number of Times Noted		
	Decreases	Unchanged	Total
Increase in gasoline prices	7	2	9
Uncertainty of the availability of gasoline	5	2	7
*CONSUMER RESISTANCE TO BUYING AS A RESULT OF THE TMI INCIDENT	5	0	5
Decrease in tourism resulting in reduced sales	5	0	5
Poor quality of 1979's agricultural commodities	4	1	5
Inadequate supplies of agricultural commodities	2	1	3
Over abundant supply of agricultural commodities	2	0	2
High prices of agricultural commodities	1	0	1

SOURCE: Pennsylvania Department of Agriculture.

volved taking six samples a week from dairies located within a 25 mile radius of the plant. As of March, 1980, reliance has been placed on the routine monitoring activities of the Department of Environmental Resources. This includes the taking of monthly milk samples from two farms, one on each side of the Susquehanna River. The Department of Agriculture will be advised of any samples with detectable contamination. Any clean-up action which would possibly release Iodine and/or Strontium would trigger confirmatory sampling by the Department of Agriculture. No further monitoring of foodstuffs other than milk is planned unless there would occur releases of radioactive material which would be considered to be a food ingestion hazard.

6.3.2 Livestock Analysis for Radiation Effects

A number of animal health studies have also been undertaken by the Department of Agriculture. Data collected in May, 1979 from 100 livestock owners within a five mile radius of the crippled nuclear plant was used to study the TMI effects on a total of 8,200 dairy cows and heifers and 1,818 beef cattle. Of those surveyed, 95 percent reported no unusual herd health problems. The remainder reported problems that were determined by the Department of Agriculture to be routine, occurring at the same rate statewide.

Several livestock owners residing near TMI felt that their animal health problems were related to the accident. In each case, the Department of Agriculture performed extensive sampling of the livestock feedstuffs for radioactivity, performed autopsies on dead animals when possible, and carried out other diagnostic tests for various diseases. To date, the Department has not found any evidence of a relationship between the livestock or poultry health problems and the accident.

The Department has also investigated plant health and insect problems attributed to Three Mile Island. To date, no relationship between the incident and these problems has been established.

The Department of Agriculture is continuing its study of possible animal health effects resulting from the accident, even though the Department feels that the level and amount of radioactive materials released as a result of the accident should not have caused either animal or plant health problems. It has underway a participatory effort with the Nuclear Regulatory Commission to again review animal health problems attributed to the accident.

6.3.3 Farm Community Attitudes

The study of the socio-economic impacts of the TMI accident on farmers undertaken by the Department of Agriculture during July and August of 1979 revealed that the relatively minor short term economic losses were not the sole concern of the farm community. A far more prevalent concern was the long term implications which are associated with their proximity to the nuclear facility. For example, almost 50 percent of the responding farmers living within ten miles of the plant stated that they either felt threatened or remained uncertain about the potential health effects of the plant. Within the 11 to 25 mile radius, one-third of the farmers expressed similar feelings. Health concerns were voiced, particularly by farm families with small children, a trait found throughout the general population in the vicinity of TMI.

One-fourth of the farmers also expressed the feeling that the TMI facility was a serious threat to their livelihood. This concern was about evenly distributed among farmers reporting throughout the 25 mile radius.

7.0 STATE AND LOCAL GOVERNMENTS

The Three Mile Island accident affected agencies of both the Commonwealth of Pennsylvania and local governments. Public sector expenses were generally manifested in increased personnel costs, extraordinary expenses during the two week crisis period, and continuing study and monitoring projects.

7.1 Costs to the Commonwealth

Costs incurred by the Commonwealth of Pennsylvania because of the TMI accident include salaries paid to employees granted administrative leave, overtime and compensatory time, and non-personnel costs for special studies or equipment.

These costs are shown in Table 7A, and are for the period between April, 1979 and mid-August, 1980.

7.1.1 Administrative Leave

Perceived danger and concern generated by the TMI accident resulted in state agencies granting administrative leave to certain employees from March 30 through April 9, 1979. Those eligible for administrative leave were:

- Pregnant employees who lived or worked within a five mile radius of Three Mile Island.
- Employees with children five years of age and under who lived within five miles of Three Mile Island.
- Employees who lived or worked within a 20 mile radius of TMI on March 30, 1979, and subsequently left work due to concerns arising from the Three Mile Island incident.

Administrative leave is defined as time away from work with salary at the appropriate straight time rate of pay. Costs were based upon the pay rate in effect on the dates when employees were granted administrative leave, and do not include employee benefit costs.

State agencies granted 23,395 hours of administrative leave at a cost of $173,131 for the period March 30, 1979 to April 9, 1979.

Table 7 A

SUMMARY OF STATE GOVERNMENT TMI RELATED
PERSONNEL AND OPERATIONAL COSTS
AUGUST, 1980

Category	Dollar Amount
Overtime Pay[1/]	$ 124,910.00
Administrative Leave	173,131.00
National Guard Wages [2/]	17,291.00
Total Short Term Personnel Costs[3/]	315,332.00
Operational Expenses[4/]	446,150.00
TOTAL COSTS	$ 761,482.00

1/ Overtime costs of $2,078.00 were incurred by the Pennsylvania Turnpike Commission, which operates solely on tolls, not taxes, and therefore this figure was not included as a state expense.

2/ The National Guard was paid straight time by the state - administrative leave and overtime are not applicable to the Guard.

3/ Most costs for administrative leave and overtime were incurred during the first several weeks following the accident.

4/ Includes costs of studies and special equipment needed because of the accident.

SOURCE: Governor's Office of Budget and Administration.

7.1.2 Overtime and Compensatory Time

Conditions produced by the accident resulted in some state employees working longer hours than normal. These employees were granted either overtime pay or compensatory time, depending upon the circumstances. In either case, non-supervisory employees are entitled to time-and-a-half pay. Supervisory employees are not normally granted overtime pay, but are eligible for compensatory time equal to the exact number of overtime hours worked.

From March 30, 1979 through March, 1980, TMI-related overtime pay and granted compensatory time for state employees totaled $124,910. Agencies incurring the largest costs were the Pennsylvania Emergency Management Agency, the Department of Environmental Resources, the State Police, the Justice Department, and the Governor's Office. Most of the overtime/compensatory time was granted during the first few weeks after the accident.

7.1.3 Operational Expenses

The accident made use of special equipment and certain follow-up studies were necessary.

Between April, 1979 and mid-August, 1980 these operational expenses, which included such items as radiological sampling and monitoring equipment, Public Utility Commission legal expenses, printing of informational booklets about radiation, etc., cost the state approximately $446,150. Since the clean-up operations for TMI are now projected by Metropolitan Edison to continue into the mid-1980's, it is likely that state operational expenses related to the accident will continue for several additional years.

7.2 Impacts on Local Governments

Almost half the municipalities and five counties within the 20 mile radius of TMI incurred accident related expenses, according to the Pennsylvania Department of Community Affairs. Table 7B breaks down the expenses incurred by local government on a radii basis.

An analysis of local governments' reported expenses by radii reveals the greatest expenses occurred in the ten mile radius ($39,869). Accident-related costs were higher here than in the five mile ring because of greater population and the proliferation of government units. The five mile radius has the

second highest aggregated costs due to the accident -- $22,766 -- and the greatest number of volunteer man-hours.

Communities in the ten to 15 mile radius had nearly the same amount of expenditures as those in the five mile radius, but the fiscal burden was spread over a greater number of governmental units.

Accident-related costs reported by the local governments included police salaries, other emergency personnel costs, office staff and supervisor costs, foregone revenues, and miscellaneous expenses. (See Table 7C.)

As Table 7C indicates, miscellaneous expenses claimed the highest toll of municipal costs for 38 local governments. Nearly the same number of local governments experienced additional police expenditures. In addition, the City of Lancaster, which is just outside the 20 mile radius and therefore is not included in these costs, reported expenses of $104,250, predominantly for litigation expenses.

Another significant expenditure was office staff and supervisors' salaries. This substantial cost is reflective of 18 governments expending funds in this category for management salaries and wages. In contrast, the other emergency personnel group represents lower cost salaries and wages for fewer communities. Revenues lost affected the fewest number of communities as only three identified this as a loss category.

Twelve local governments indicated a negative budget impact because of the extraordinary TMI costs. Three communities indicated they would make a line item shift from another expenditure category while only one municipality mentioned the possible need for a tax increase. One county government felt their realty tax revenues suffered a decrease of $5,198.

With respect to long range costs of the TMI accident, ten local governments reported anticipated expenses ranging from $900 to $42,000 for a total of $175,836. However, most of the municipalities felt they could not estimate the long range costs of TMI.

7.3 Cost Mitigated by Insurance Payments

Metropolitan Edison partially reimbursed local governments within a 15 mile radius of the plant for extraordinary expenses they incurred during the crisis period. This voluntary repayment program mitigated, to a large extent, the cost

Table 7 B

ACCIDENT COSTS TO LOCAL GOVERNMENTS
BY RADII FROM TMI

Radius	Number of Municipalities	Dollars Reported	Volunteer Man Hours
0-5 miles	8	$22,765	8,031
6-10 miles	15	39,869	4,654
11-15 miles	17	22,281	5,115
16-20 miles	11	5,404	5,215
TOTAL	51	90,319	23,015
County Governments	7	58,036	
GRAND TOTAL		$148,355	

SOURCE: Pennsylvania Department of Community Affairs.

Table 7 C

ACCIDENT COSTS TO LOCAL GOVERNMENTS
WITHIN 20 MILE RADIUS OF TMI

Category	Total $	Av. $ Per Local Gov't.	Range	No. of Governments Affected	Municipalities Reporting Volunteers
Police salaries	$31,593	$854	$50-5,962	37	8
Other emergency personnel	1,978	247	$27-662	8	20
Office staff & supervisors	29,328	1,629	$15-4,064	18	23
Revenues lost	13,884	4,721	$83-13,900	3	0
Miscellaneous (food, fuel, duplicating, telephone)	66,572	1,752	$1,225-4,000	38	8
TOTAL	$148,355				

SOURCE: Pennsylvania Department of Community Affairs.

burden imposed on local government by the accident. In all, Metropolitan Edison has paid almost $85,000 to local governments or approximately 95 percent of the amount they claimed.

As Table 7D indicates, the amount of insurance claims paid by Metropolitan Edison is slightly less than claimed. The claims filed were less than total reported accident expenses as Metropolitan Edison reimbursed local governments only for their extra costs. For example, personnel costs were paid only for overtime hours worked. Overall, such payments represent about 57 percent of the total reported accident expenses.

As of June, 1980, 17 claims from communities, school districts, or educational institutions were still pending. While two of the 17 were for undisclosed amounts, the remainder amounted to $151,146 in claims pending.

7.4 Municipal Capital Expenditures

Municipal capital investments are necessary to maintain and improve a community's physical infrastructure, such as streets and parks, and to deliver necessary services to residents. In order to determine if any reduction in capital investments occurred after the TMI accident, data on capital expenditures for 1975 through 1979 was analyzed to determine any expenditure trends. (See Table 7E.)

7.4.1 Parks and Recreation

Parks and recreation expenditures include park maintenance, playgrounds, golf courses, swimming pools and landscaping. Only 58 of the 115 municipalities within a 20 mile radius of TMI made expenditures within this category, which indicates parks/recreation is not a high priority expenditure.

From 1975 to 1976, municipal spending for parks and recreation within the total 20 mile radius increased by about six percent. This increase was largely due to higher spending in the 11 to 15 mile radius while the other radii declined significantly during this period. This decrease is attributable to the fact that municipalities were caught between the inflationary spiral and citizenry demands for lower taxes. Fiscal dilemmas of this nature generally force local governments to curtail expenses for low priority line items such as parks and recreation.

Table 7 D

INSURANCE CLAIMS FROM LOCAL GOVERNMENTS

	Accident Expenses Reported	Insurance Claims	Insurance Claims Paid
Local Governments	$ 90,319	$ 49,981	$ 45,444
County governments	58,036	39,558	39,429
TOTAL	$ 148,355	$ 89,539	$ 84,873

SOURCE: Pennsylvania Department of Insurance.

TABLE 7 E

MUNICIPAL CAPITAL EXPENDITURES AND INVESTMENTS

	1975	1976	% Change	1977	% Change	1978	% Change	1979	% Change
Parks & Recreation									
0-5 Miles	$282,894	$60,644	-78.6	$47,133	-22.3	$37,114	-21.3	$22,240	-40.1
6-10 Miles	261,253	166,521	-36.3	264,874	59.1	150,739	-43.1	65,686	-56.4
11-15 Miles	425,026	852,352	100.5	597,576	-29.9	904,346	51.3	633,240	-30.0
16-20 Miles	183,607	142,929	-22.2	302,687	111.8	63,409	-79.1	124,810	96.8
TOTAL	$1,152,780	$1,222,446	6.0	$1,212,270	- 0.8	$1,155,608	- 4.7	$845,976	-26.8
Health & Sanitation									
0-5 Miles	-0-	-0-	-0-	28,451	-0-	24,107	-15.3	15,407	-36.1
6-10 Miles	456,784	147,226	-67.8	177,201	20.4	90,661	-48.8	60,345	-33.4
11-15 Miles	926,765	346,495	-62.6	2,694,517	677.7	8,218,279	205.0	5,165,785	-37.1
16-20 Miles	123,681	89,804	-27.4	247,915	70.9	349,894	128.0	496,295	41.8
TOTAL	$1,507,230	$583,525	-61.3	$3,148,084	439.5	$8,682,941	175.8	$5,737,832	-33.9
Public Safety									
0-5 Miles	26,388	34,024	28.9	20,550	-39.6	35,787	74.2	27,580	-22.9
6-10 Miles	95,937	85,391	-11.0	64,530	-24.4	68,686	6.4	202,879	195.4
11-15 Miles	508,954	491,497	- 3.4	249,012	-49.3	422,028	69.5	371,434	-12.0
16-20 Miles	129,557	138,616	7.0	126,031	- 9.1	105,893	-16.0	73,013	-31.1
TOTAL	$760,836	$749,528	- 1.5	$460,123	-38.6	$632,394	37.4	$674,906	6.7
Streets & Highways									
0-5 Miles	145,336	265,032	82.4	192,399	-27.4	450,617	134.2	197,426	-56.2
6-10 Miles	1,698,583	1,296,204	-23.7	1,060,621	18.2	1,706,484	60.9	1,289,934	-24.4
11-15 Miles	2,830,500	3,048,605	7.7	3,530,588	15.8	4,044,654	14.6	3,077,744	-23.9
16-20 Miles	1,935,108	2,924,712	51.1	2,241,331	-23.4	2,331,776	4.0	1,878,472	-19.4
TOTAL	$6,609,527	$7,534,553	14.0	$7,024,939	- 6.8	$8,533,531	21.5	$6,443,576	-24.5

SOURCE: Capital Region Planning & Development Agency, Pennsylvania Department of Community Affairs, Municipal Statistics Division.

In the overall 20 mile radius, declines in expenditures were registered every year from 1976 through 1979. The worst decline for the total 20 mile radius occurred from 1978 to 1979, but it was only a decrease of 2.7 percent.

7.4.2 Health and Sanitation

Capital outlays for health and sanitation primarily entail construction of sanitary sewers for collection and disposal of sewage. Fifty-four of the 115 communities within the TMI area made such a line item expenditure in 1979, slightly less than the number having parks/recreation expenses. This number is indicative of the rural nature of the area and lack of consolidated sewage treatment systems.

Overall, heatlh and sanitation investments have fluctuated greatly over the period 1975 to 1979.

7.4.3 Public Safety

Public safety needs include police protection, fire protection, building regulation, and planning and zoning. More communities in the 20 mile radius make investments in these services than the previous categories -- 74 of the 115 interviewed. This category of need is generally high on the list of citizen demands and the community's responsibility to provide. However, budget cutbacks in recent times have forced the delay of more sophisticated safety equipment and additional necessary manpower. Planning and zoning is usually the most expendable budget item within the public safety category as it is generally considered the least crucial service.

Percent changes from 1975 to 1979 showed no set pattern for any of the radii. Increases and decreases fluctuate among the communities, but in the 20 mile radius, public safety expenditures are increasing. This upturn is largely due to heavier expenditures in the six to ten mile radius by Derry, Swatara, Mt. Joy and Manchester Townships.

7.4.4 Streets and Highways

All of the 115 municipalities within the TMI study area made capital outlays for street and highway construction and rebuilding in recent years. The pattern of municipal streets/highways investments appears somewhat cyclical, as expenditures dropped substantially in 1978-1979. Before that time,

both the zero to five mile radius of TMI and the total 20 mile area alternated increases and decreases since 1975. However, from 1978 to 1979, the most severe declines occurred, not only for the zero to five mile radius and the total 20 mile area, but for the other radii as well. Furthermore, the decline appears to lessen with distance from TMI.

Analysis: A review of municipal capital expenditures shows no evidence of disinvestment following the TMI accident. Historically, these expenditures fluctuate substantially on a yearly basis, and in 1979 tightening money markets with concurrent soaring inflation had a negative impact on local governmental capital expenditures. TMI does not emerge as having a negative impact.

While it is possible that some communities cut back some expenditures inorder to absorb TMI-related costs, such adjustments were minor and not indicative of any long term disinvestment trends.

7.5 Community Development Programs

Community Development Block Grant (CDBG) recipient communities near TMI were contacted to determine what, if any, effects the accident had on these programs. CDBG programs in this area primarily encompass housing, redevelopment, and revitalization needs. The consensus of the interviews was that TMI did not affect any goals, achievements, or implementation of these programs. The four communities examined include Middletown, Steelton Borough, Swatara Township, and Harrisburg City. A description of each community program can be found in Appendix D.

7.6 Municipality Emergency Needs and Technical Assistance

Studies conducted by the Pennsylvania Department of Community Affairs with local governments in a 20 mile radius of TMI identified emergency planning as the major technical assistance need. Communities also indicated that hazardous materials training, citizen education and emergency equipment were additional needs in the event of another nuclear accident.

Consequently, the Department of Community affairs, in coordination with the Pennsylvania Emergency Management Agency and other state agencies, held two seminars on emergency management and hazardous materials training in the spring of 1980.

In addition to reviewing aspects of emergency management, the agenda for these seminars addressed the topics of hazardous materials training, evacuation planning, citizen education and community development programs.

DCA also provided other types of technical assistance to communities in a 20 mile radius of TMI, as described in Table 7F.

Another general type of technical assistance undertaken by DCA focused on community development problems. This entailed housing, neighborhood development, rehabilitation, and community planning assistance. The following entities received services of this nature from the Department of Community Affairs:

Dauphin County

Dauphin County Redevelopment Authority
Middletown Borough
Steelton Third Street Strategy Project
City of Harrisburg Department of Community Development
Harrisburg Redevelopment Authority
Lower Swatara Township

York County

Community Development Office, New Market Neighborhood Strategy Agea
City of York
York County Planning Commission
York Area Development Corporation
York Area Housing Corporation

7.7 Federal Funding Requests

All requests by local governments within a 20 mile radius of TMI for assistance requiring federal funds were reviewed by the Department of Community Affairs. As such requests were processed through the Pennsylvania Clearinghouse for A-95 review, DCA monitored them for projects which might be TMI-related.

DCA's review has revealed no request for assistance directly related to TMI.

Table 7 F

TECHNICAL ASSISTANCE PROJECTS

Government Unit	Type of Assistance	Specialized Area
York County	Plan for intra-York Co. municipalities joint operation of emergency operations facilities	Intergovernmental cooperation
North York Borough	Regional code enforcement program	Use of energy conservation techniques
Fairview Township	Preparation of personnel policy manual Training in use of automated utility bill systems	
Newberry Township	Study of township police service and management Accounting assistance for general ledgers	
Goldsboro Borough	General assistance	
Manheim Township	Determination of additional means of revenue	

SOURCE: Pennsylvania Department of Community Affairs.

8.0 LONG RANGE IMPACTS

8.1 The Cost of Electricity

A major continuing economic impact of the TMI-2 accident is the higher electricity costs which have been imposed on Metropolitan Edison's customers, and, to a lesser extent, those of its corporate sisters, Pennsylvania Electric (which serves a wide geographic area in central and western Pennsylvania) and Jersey Central (an out-of-state utility). All three operating utilities are subsidiaries of General Public Utilities, a holding company headquartered in New Jersey. The financial burden of the accident has been imposed largely on Metropolitan Edison, which owns 50 percent of the Three Mile Island plant, with the remaining ownership shared equally between Pennsylvania Electric and Jersey Central. Pennsylvania Electric, which is fundamentally a coal-fired utility, drawing only a small proportion of its power needs from the TMI plant, has been impacted considerably less by the accident than Metropolitan Edison. For Metropolitan Edison ratepayers, however, the cost increases imposed in the wake of the accident have been significant. The average residential customer has experienced a 50 percent increase in electricity costs over March, 1979 levels.

8.1.1 TMI Units 1 and 2 Both Out of Service

While the accident affected only TMI-2, its sister unit, TMI-1, which occupies the same site, has also been affected by the accident. TMI-1 is a separate, undamaged nuclear reactor which was out of service for routine refueling at the time of the accident. TMI-1 was scheduled to return to service on March 28, 1979, the day the accident began. Since then the Nuclear Regulatory Commission (NRC) has not allowed TMI-1 to resume generating power. Instead, the NRC will conduct hearings on the issues and concerns inherent in restarting TMI-1 in the fall of 1980, with a decision expected some time in 1981.

The outage of both TMI units, with the loss of approximately 1,700 megawatts of nuclear power, has placed a considerable strain on Metropolitan Edison's operating ability. The utility had a surplus of generating capacity available prior to the accident but, with both units out of service, Met Ed is now unable to meet the power needs of its customers. Replacement power is now being purchased from a number of other utilities and the need for continued power purchases is expected to continue into the near future. Should TMI-1 return to service,

it could significantly reduce Met Ed's need to purchase power and also relieve Met Ed, to a large extent, of the financial and cash flow difficulties they are currently experiencing.

8.1.2 Met Ed's Rates

Before the TMI-2 accident, Metropolitan Edison enjoyed highly competitive rates when compared to the other utilities in the state. At that time, only two other Pennsylvania utilities, Pennsylvania Power and Light and West Penn Power, had lower rates in force for residential customers. In fact, until the time of the accident, Metropolitan Edison did particularly well in slowing the inflationary cycle of rapidly escalating rates which had been experienced by all power companies in the aftermath of the OPEC price increases of 1973. The post-accident period has seen the PUC grant the utility two extraordinary rate increases while concurrently removing TMI-1 and TMI-2 from the rate base.

8.1.3 PUC Actions

When it first acted to address the regulatory and rate-making problems created by the accident, the Pennsylvania Public Utility Commission (PUC) on June 15, 1979, issued an order which:

- Removed TMI-2 from Met Ed's rate base since it was found "not used and useful in the public service". This had the effect of reducing Met Ed's revenues by $49.2 million on an annualized basis. TMI-2, which began commercial operation on December 30, 1978, had been included in the rate base only days prior to the accident.

- Allowed Met Ed an 8.8 mill rate increase for purchased power costs necessitated in the wake of the accident. This had the impact of increasing revenues by approximately $69 million on an annualized basis.

In December, 1979, the PUC launched a second set of landmark proceedings concerning the Met Ed/TMI situation. The Commission initiated these hearings in the form of a show cause order to Metropolitan Edison questioning their ability to continue to provide service. Subsequently, the utility filed for an additional rate increase citing the need for increased revenues to pay for purchased power costs. At the conclusion of its deliberations in May, 1980, the PUC decided:

- To remove TMI-2 from rate base, thus reducing Met-Ed's annual revenues by $26.9 million, or 3.4 mills.

- To allow Met Ed to retain its operating license since they found no "imminent or forseeable threat to continued provision of adequate and reliable service at reasonable rates"

- To grant Met Ed a rate increase of $55 million annually, or 6.9 mills, as a supplement for their purchased power charges.

- To add an additional 3.4 mills, or $26.9 million annually, to alleviate the hardship of removing TMI-1 from rate base.

- To grant an additional 7.4 mills, or $56.4 million annually, over an 18 month period to allow for repayment of bank loans incurred for replacement power costs.

Overall, Met Ed received rate increases of $111 million, a level which the PUC believed "will provide Met Ed the means of financial rehabilitation".

These actions had the overall impact of dramatically altering upward Metropolitan Edison's rate structure from their pre-accident levels. The bill of an average residential customer using 500 kilowatt hours per month (kwh) increased from $22.93 in March, 1979 to $35.21 in July, 1980, an increase of nearly 54 percent. A comparison of Met Ed's rates with those of other Pennsylvania utilities is shown in Table 8A.

With the inclusion of these increases, Met Ed's rates are the second highest in Pennsylvania for residential users and third highest for commercial and industrial customers. Yet, Met Ed rates remain generally competitive in comparison to other utilities in the Northeast region.

8.1.4 Future Rates

Near the end of the PUC's second set of hearings on the Met Ed/TMI situation, the utility announced its intention to file for an additional rate increase. Subsequently, Met Ed placed a price tag of $76.5 million on their request. The company cited the effects of inflation on their operations and maintenance programs, and the need to cover the investment, maintenance and operations costs of the undamaged TMI-1 in their rate base (TMI-1 was removed from Met Ed's rate base in the May, 1980 PUC decision).

Table 8 A

RATE COMPARISON: METROPOLITAN EDISON AND MAJOR PENNSYLVANIA UTILITIES JULY, 1980

Residential 500 KWH	Cost	Index Met Ed = 100
Duquesne Light	$ 35.04	88.38
METROPOLITAN EDISON	35.21	100.00
Pennsylvania Electric	28.45	80.80
Pennsylvania Power	33.97	97.95
Pennsylvania Power & Light	25.98	73.78
Philadelphia Electric	38.13	108.29
Luzerne Electric (UGI)	33.05	93.86
West Penn Power	23.89	81.03
Commercial 40 KW, 10,000 KWH		
Duquesne Light	$703.21	108.35
METROPOLITAN EDISON	649.00	100.00
Pennsylvania Electric	570.59	87.92
Pennsylvania Power	572.77	88.25
Pennsylvania Power & Light	529.82	81.64
Philadelphia Electric	890.96	137.28
Luzerne Electric (UGI)	621.24	95.72
West Penn Power	410.49	63.25
Industrial 1,000 KW, 200,000 KWH		
Duquesne Light	$12,656	102.34
METROPOLITAN EDISON	12,366	100.00
Pennsylvania Electric	10,264	83.00
Pennsylvania Power	10,500	84.91
Pennsylvania Power & Light	8,573	69.33
Philadelphia Electric	14,847	120.06
Luzerne Electric (UGI)	8,977	72.60
West Penn Power	7,243	58.57

SOURCE: Telephone interviews with Pennsylvania electric utility companies.

In late August, 1980 the PUC, in affirming a decision issued previously by its administrative law judge, denied Met Ed a $35.0 million emergency rate increase. The PUC has yet to rule on the proposed $76.5 million general rate increase which the company has requested. The $35.0 million emergency rate increase, if granted, would have been an advance on the larger increase.

Another potential surcharge on Met Ed's ratepayers revolves around the question of who pays for the clean-up of TMI-2. In early August, 1980, Met Ed announced a revised time schedule and issued updated cost estimates for accomplishing the clean-up of TMI-2. The entire clean-up and decontamination project for the damaged reactor, originally estimated to be completed in mid-1983, has been extended several years beyond. The total cost has been increased from $400 million to at least $760 million.

Met Ed officials and some interest groups have advanced the idea of either a national surcharge on all electricity generated by nuclear power, or some form of governmental assistance to pay for the clean-up of TMI-2, thereby reducing the economic burden on Met Ed's customers. On a yearly basis, the cost of clean-up is at least $112 million for each of the years 1981 through 1985.

The estimated yearly clean-up cost of $112 million nearly equals the $111 million in rate increases which Met Ed received in May, 1980, to cover their purchased power and associated costs. Consequently, if TMI-1 is granted permission by the NRC to restart, the economic benefits of reduced purchased power costs for the ratepayers may not materialize if the full cost of the clean-up is imposed on the ratepayers.

8.2 Insurance Claims and Lawsuits

8.2.1 Background

Congressional enactment of the Atomic Energy Act of 1954, and the subsequent passage of the Price-Anderson Act of 1957, permitted the private sector to develop nuclear power for peaceful purposes, with limited liability. The Price-Anderson Act established insurance pools to provide utility companies and other nuclear power users with protection from liability suits. The Price-Anderson Act also set a liability limit for any individual nuclear accident at $560 million per site and explicitly retained Congressional authority to provide additional funds, if necessary. The $560 million is obtained from three separate sources. The first $140 million is pro-

vided by the private insurance industry with an additional $360 million provided by an assessment of $5 million on each operating nuclear power plant. The federal government is responsible for the balance, or $60 million.

In addition to the Price-Anderson coverage, Metropolitan Edison had insured the TMI nuclear plant for $300 million against any property damage. That fund is now being used to help defray plant clean-up costs.

In the event of an operating nuclear power plant accident, the Price-Anderson Act authorizes the Nuclear Regulatory Commission to determine if the accident constitutes an extraordinary nuclear occurrence (ENO). Certain conditions must be met, such as high radiation levels, property damage, and personal injury before an ENO can be justified. If an ENO is declared, individuals can then be compensated for their losses.

The NRC ruled in April, 1980 that the TMI accident was not an ENO. If an ENO had been designated, the no-fault insurance system backed up by the $560 million from the Price-Anderson insurance pool would have gone into effect and those claiming damages in areas located near to the accident site would only have to show losses to receive reimbursement. Without an ENO declaration, claimants pressing for damages have a much more difficult legal course, as their claims will be decided under Pennsylvania's tort laws.

8.2.2 Insurance Claims Settled

Following the evacuation advisory for pre-school age children and pregnant women living within a five mile radius of TMI which was issued on March 30, 1979, Metropolitan Edison's insurers made advance relocation payments to affected families. Several locations were established in this area where families could obtain cash advances for anticipated relocation expenses.

Persons and families whose cash advance did not cover their allowable expenses, or for a variety of reasons did not receive an initial advance, filed claims after the 11 day advisory was cancelled to recoup lost wages, and expenses for food and shelter.

Metropolitan Edison's insurers, as of April 30, 1980, had paid 3,170 relocation claims amounting to $1,309,540. Wage loss claims paid by the same date totaled 814 and resulted in payments of $92,274. (See Table 8B.)

Table 8 B

INSURANCE CLAIMS AND LAWSUITS
(AS OF APRIL 30, 1980)

	Claims Paid	
Category	No.	Amount
Private Relocation	3,170	$1,309,540
Private Wage Loss	635	92,274
Total	3,805	$1,401,814
Local Government Agencies	33	$ 84,873

	Claims Pending	
Category	No.	Amount
Business Interruption	125	$1,755,419[2/]
Individual Lawsuits	20	unknown[3/]
Class Actions	2	unknown[4/]
Local Government Agencies	17	$ 151,136[1/]

1/ At a minimum, since some claimants list damages as unknown. Includes local government, school districts and the Pennsylvania State University.

2/ At a minimum, since many claims list damages as unknown, but in excess of $10,000. All business interruption claims are eligible within a 25 mile radius from TMI.

3/ Most list damages as unknown, but in excess of $10,000. Individual economic loss claims are eligible for inclusion in a class action if incurred in a 25 mile radius from TMI.

4/ Consolidates plaintiffs in two distinct classes: economic business losses and private economic costs.

SOURCE: Pennsylvania Department of Insurance.

In the months since the accident, the volume of relocation claims has steadily diminished, indicating that the figures given for April, 1980 will probably not change substantially as remaining claims are paid.

Not all relocation and wage claims were accepted by the insurance pool. A total of 1,340 or 26.4 percent were rejected. The major reason for rejection was that the claimant lived outside the five mile radius. The wage loss claims paid were less than relocation claims primarily because a considerable number of those relocating were not members of the labor force. The average wage loss payment, according to the Pennsylvania Department of Insurance, has been calculated at approximately $145, or a loss over eight working days at $18 per day. For the individual, this amount indicates that the accident's impact on wage loss was minimal. However, for many employers, including the Commonwealth of Pennsylvania, which did not deduct wages for time lost because of the accident, the wage loss impact was greater.

8.2.3 Pending Claims -- Class Action Lawsuits

After the accident, many of the pending lawsuits were consolidated into one class action, as required by the Federal Rules of Civil Procedure. The purpose for consolidating these suits is to permit consideration of questions common to all in one proceeding, thus saving legal expense and court time.

The consolidated suit which was filed includes 73 named plaintiffs who alleged losses as a result of the accident, as divided into the following classes: all individuals or firms within a 25 mile radius of TMI who suffered economic harm; all homeowners or residents within a 25 mile radius of TMI who suffered economic harm; and all individuals within a 25 mile radius who suffered personal injury, incurred medical expenses or suffered emotional distress.

In July, 1980 a U. S. District Court Judge for Pennsylvania ruled that, of the three classes, only those resulting in non-physical loss claims would be consolidated into one case, thus excluding personal injury claims from consideration along with those alleging business and private economic harm. Claims of personal physical or psychological damage are so individually distinct, according to the District Court Judge, that there are no common problems -- a prerequisite for inclusion in a class action procedure. Persons with personal injury claims must file separate lawsuits for individual trials.

Further action on the consolidated class action suit will probably not be scheduled by the U. S. District Court until 1981. But when the case for the two classes is brought to civil trial, the focus will be on the alleged liability for the accident by the defendants, Metropolitan Edison and other companies associated with the accident. The common issues, according to the judge:

> "Will relate to defendants' liability and will address questions such as: what happened, why, what types of damage were sustained by the plaintiffs, who was responsible, and were the damages forseeable?
>
> "The questions affecting only individual members will be primarily those of damages . . . Undoubtedly, the damage claims resulting from the TMI incident will have to be scrutinized individually."

8.2.4 Business Interruption Claims

Alleged damages claimed by 125 businesses amounting to a minimum of $1,755,419 were, in April, 1980, also included in the consolidated lawsuit. Claimants in this category are limited to those alleging economic harm due to the accident. Of the 125 businesses, 69 have specified dollar amounts while the balance have listed the cost of the accident to their business as unknown. Claims range from a low of $100 in lost revenue for a small service related business to a six figure amount for a large manufacturing company, with most in excess of $10,000. In July, 1980, the U. S. District Court decided to allow all businesses within 25 miles of TMI who suffered economic damages to have their claims considered as one all-inclusive class. The potential exists for many of those who did not file claims by April, 1980 to file to become part of the described class. This could raise upward the number of claimants and the ultimate dollar amount, but to what extent cannot be determined at this time.

The majority of the business claims filed are almost equally divided between the two categories; about 53 claims for retail trade, and 51 for service businesses. While the manufacturing sector filed only nine claims, their ultimate dollar amount could equal or exceed retail trade and services, since several manufacturing businesses listed claims for substantial dollar amounts.

8.2.5 Private Lawsuits

By April, 1980, most private suits claiming economic damages and personal injury related to the accident had been consolidated into one suit. Individuals, however, retained the right to show reasons why their case should be treated separately. By the end of April, 1980, 20 private suits had been given separate standing, and the rest were consolidated.

A claim typical of those filed is one by a husband and wife, including their children as plaintiffs, in which recovery of damages and diminution in the value of personal and real property (including loss of income, travel and evacuation expenses) is sought. Damages for physical and emotional injury due to exposure to radioactive materials, and damages to cover the need for medical examinations over the next 20 years, as well as punitive damages, are also sought.

The volume of private suits filed has paralleled the pattern of other claim categories, and as the time since the accident increases, the number of suits decreases. Whether this trend will continue is not certain, since the personal and physical injury aspect of private claims may continue to manifest itself over time. Also, the ruling of the District Court in July, 1980, stipulating that all private economic loss claims within the 25 mile radius of TMI (but not those for personal injury) would be eligible to join a class for litigation purposes, may result in the filing of additional claims.

8.3 Manufacturing

There are TMI-related issues that have long-term implications for the future economic welfare of the area.

8.3.1 Majority of Manufacturing Establishments Would Expand in Spite of TMI Accident

The study conducted by the Pennsylvania Department of Commerce sought views from the management of manufacturing firms concerning whether the TMI accident would deter expansion (the respondent firm was asked to suppose that it would consider expanding operations). This question not only inquired whether the manufacturer's willingness to expand would be inhibited at its current location, but also at other locations at varying five-mile distances from the Three Mile Island nuclear plant.

Not every respondent indicated an opinion concerning whether or not they would be deterred from expanding in each and every one of the five mile radii. The respondents seemed more able and more willing to express an opinion about expansion in the radius within which they were located. Therefore, the information from the sample is considered to be more reliable for these areas. Table 8C highlights the most reliable data for each radius.

Table 8C shows the degree to which the respondents would be deterred from expanding within each radius. It consists of a set of percentages representing the ratio of the number of answers given about expansion in each radius to the number of responding establishments located there.

Analysis of the table indicates that the deterring effect of the TMI accident on manufacturing plant expansion declines with increasing distance from TMI. In most cases, the majority of respondents indicated that they would not be deterred from expanding within any of the various radii regardless of distance from TMI. On the other hand, there appears to be some deterring influence of TMI throughout the area, regardless of which radius is considered. For example, examination of the most reliable data shows that the range of the respondents who would be deterred from expanding lies between 21 and 34 percent.

8.3.2 Decontamination of TMI-2 Not Expected to Hurt Economy

Decontamination of TMI-2 has been proceeding since the accident. Venting of Krypton gas as well as use of Epicore II to clean up radioactive water have been underway for many months. Yet several more years are expected to be needed before the clean-up can be termed complete.

The Department of Commerce wanted to gain insight concerning whether the manufacturing sector perceived the decontamination effort to have any adverse economic effect. Over 75 percent of all the establishments expressed the opinion that decontamination would have no effect (see Table 8D). Less than four percent felt that the decontamination activities would adversely affect them. And 12 percent were not sure what the economic effects of decontamination would be.

The non-durable group of manufacturing industries expressed a perceived adverse effect to a greater extent than did the durables. Nearly six percent of the total non-durable manufacturing firms felt this way. Within the non-durables group, food had the greatest concern for an adverse effect. In fact, food and kindred products expressed a greater concern about an adverse economic effect than did any other industry group.

Table 8 C

DISTANCE VARIATION OF EFFECTS OF TMI ACCIDENT ON MANUFACTURING PLANT EXPANSION

Respondent's Distance From TMI (miles)	No. of Establishments by Distance 1/	Attitudes Regarding Deterrence to Expansion in Each Radius (Answers as % of Establishments)														
		0-5 Miles			5-10 Miles			10-15 Miles			15-20 Miles			Over 20 Miles		
		Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure
0-5	13	30.8	46.2	0	23.1	15.4	0	7.7	23.1	0	7.7	23.1	0	0	30.8	0
5-10	51	23.5	31.4	3.9	27.5	41.2	13.7	15.7	37.3	2.0	13.7	35.3	3.9	13.7	39.2	5.9
10-15	97	26.8	30.0	6.2	23.7	25.8	5.2	24.7	52.6	3.1	12.4	44.3	0	11.3	43.3	3.1
15-20	71	18.3	19.7	16.9	14.1	23.9	15.5	12.7	22.5	19.7	21.1	38.0	14.1	18.3	38.0	11.3
Over 20	110	24.5	23.6	7.3	21.8	22.7	7.3	19.1	24.5	9.1	18.2	27.3	6.4	33.6	41.8	19.1
TOTAL	342															

1/ Location by distance from TMI was known for 342 of the 348 total sample responding establishments. Six respondents to the manufacturing study did not report distance from TMI.

NOTE: 335 of the 348 total sample responding establishments provided information used in this Table. Since the 13 non-respondents comprise less than four percent of the total sample, this small information gap was not felt to be significant.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 8 D

PERCEIVED ECONOMIC EFFECTS OF DECONTAMINATION OF UNIT 2 BY MANUFACTURING GROUPS

Group	Group Universe	Adverse Effect	% of Group Universe	No Effect	% of Group Universe	Not Sure	% of Group Universe	Opinion Unknown	% of Group Universe
Primary & Fabricated Metals	157	5	3.2	148	94.3	4	2.5	0	0
Machinery, including Electrical	209	2	1.0	160	76.6	7	3.3	40	19.1
All Other Durable Goods	213	2	0.9	161	75.6	38	17.9	12	5.6
TOTAL DURABLE GOODS	579	9	1.5	469	81.0	49	8.5	52	9.0
Food & Kindred Products	148	9	6.1	102	68.9	21	14.2	16	10.8
Textile Mill & Apparel Products	117	6	5.1	83	70.9	27	23.1	1	0.9
All Other Nondurable Goods	297	17	5.7	220	74.1	41	13.8	19	6.4
TOTAL NONDURABLE GOODS	562	32	5.7	405	72.1	89	15.8	36	6.4
TOTAL MANUFACTURING	1,141	41	3.6	874	76.6	138	12.1	88	7.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Apparel, another industry in the non-durable group, seemed to be very unsure what the effect would be. Over 23 percent expressed such an opinion.

Of the total 1,141 manufacturing establishments in the area, a significant 16 percent were unable to declare that decontamination would have no effect. This includes the four percent which felt the effect would be adverse and the other 12 percent which were unsure of the effect.

The response to this part of the Department's study also indicated that there were many more small establishments which perceived an adverse effect or were not sure of the effect. However, a much greater share of larger establishments felt that way. In addition, a surprising 32 percent of all large non-durable goods establishments (32 of the 101 large non-durable firms) perceived an adverse effect or were not sure of the economic effect of decontamination.

8.3.3 Manufacturing Perceives No Significant Economic Impact from Reactivation

The ultimate long range issue is the reactivation of TMI-1 and TMI-2. Even though these events remain in the future, the Department of Commerce's study solicited information concerning the opinion of manufacturers about what the expect the long-term economic impact of accomplishing these tasks would be.

Roughly two-thirds of all manufacturers perceived no significant economic impact as a result of the reactivation of either unit. (See Tables 8E and 8F.) In the case of both units, less than four percent viewed the reactivation in a negative way. The food industry appears to be more concerned about reactivation than any other industry, but still only ten percent of such establishments viewed the reactivation negatively.

Many establishments viewed reactivation as providing such benefits as decreased energy costs, increased reliability in source of energy supply, and the elimination of a crippled nuclear plant from the TMI area.

It should be pointed out that not all manufacturers were able to make a clear judgement as to what the long-term economic impact would be. The tables show that 20 percent of the establishments were either not sure (14 percent) or did not provide any information when requested (six percent).

Table 8 E

PERCEIVED LONG TERM ECONOMIC IMPACTS OF REACTIVATION OF UNIT 1

MANUFACTURING

Group	Group Universe	Positive	% of Group Universe	Negative	% of Group Universe	No Significant	% of Group Universe	Not Sure	% of Group Universe	Opinion Unknown	% of Group Universe
Primary & Fabricated Metals	157	9	5.7	6	3.8	110	70.1	17	10.8	15	9.6
Machinery, including Electrical	209	25	12.0	4	1.9	135	64.6	9	4.3	36	17.2
All Other Durable Goods	213	20	9.4	5	2.3	135	63.4	53	24.9	0	0
TOTAL DURABLE GOODS	579	54	9.3	15	2.6	380	65.6	79	13.7	51	8.8
Food & Kindred Products	148	13	8.8	15	10.1	100	67.6	19	12.8	1	0.7
Textile Mill & Apparel Products	117	4	3.4	3	2.6	80	68.4	30	25.6	0	0
All Other Nondurable Goods	297	58	19.5	3	1.0	190	64.0	30	10.1	16	5.4
TOTAL NONDURABLE GOODS	562	75	13.3	21	3.7	370	65.8	79	14.1	17	3.0
TOTAL MANUFACTURING	1,141	129	11.3	36	3.2	750	65.7	158	13.8	68	6.0

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 8 F

PERCEIVED LONG TERM ECONOMIC IMPACTS OF REACTIVATION OF UNIT 2

MANUFACTURING

Group	Group Universe	Positive	% of Group Universe	Negative	% of Group Universe	No Significant	% of Group Universe	Not Sure	% of Group Universe	Opinion Unknown	% of Group Universe
Primary & Fabricated Metals	157	9	5.7	6	3.8	113	72.0	17	10.8	12	7.7
Machinery, including Electrical	209	24	11.5	5	2.4	135	64.6	9	4.3	36	17.2
All Other Durable Goods	213	13	6.1	5	2.3	134	62.9	53	24.9	8	3.8
TOTAL DURABLE GOODS	579	46	7.9	16	2.8	382	66.0	79	13.6	56	9.7
Food and Kindred Products	148	12	8.1	15	10.1	101	68.3	20	13.5	0	0
Textile Mill & Apparel Products	117	3	2.6	3	2.6	81	69.2	30	25.6	0	0
All Other Nondurable Goods	297	57	19.2	11	3.7	177	59.6	31	10.4	21	7.1
TOTAL NONDURABLE GOODS	562	72	12.8	29	5.2	359	63.9	81	14.4	21	3.7
TOTAL MANUFACTURING	1,141	118	10.3	45	3.9	741	64.9	160	14.0	77	6.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Because of a large amount of publicity and drama associated with the accident, it might be expected that the manufacturers' feelings about reactivation would be quite different with respect to TMI-1 as compared with TMI-2. Surprisingly, this was not the case; the opinions concerning reactivation of both units were practically the same.

8.4. Nonmanufacturing

The Department of Commerce's study of nonmanufacturing also obtained information concerning the accident's deterring effects on nonmanufacturing expansion, the possible economic effects of decontamination, and nonmanufacturers' attitudes concerning perceived economic effects of reactivation of TMI-1 and TMI-2.

8.4.1 Most Nonmanufacturing Entities Would Not be Deterred from Expanding

The Department of Commerce's study sought opinions from nonmanufacturing businesses concerning whether the TMI accident would deter their willingness to expand (supposing that they would consider expanding their operations). They were asked if their expansion would be deterred at their current locations as well as other locations around the TMI area.

Not every respondent expressed an opinion about expanding in each of the radii. The most numerous answers dealt with expansion of respondents within their own radius location. Therefore, the most reliable data concerns the respondents' answers about expanding within the radius in which they are located.

As Table 8G shows, the deterring influence generally declines with increasing distance from the plant. The table also shows that the majority of the respondents, as was the case in manufacturing, would not be deterred from expanding in their own radius location or anywhere else in the TMI area. This was true for 40 to 60 percent of the respondents. When comparing the two sectors, it appears that a greater share of nonmanufacturing entities would not be deterred from expanding than was the case in manufacturing.

8.4.2 Decontamination of Unit 2 Not Perceived to Affect the Economy

Most of the nonmanufacturing firms in the six county area of study perceive that the decontamination effort will have no

Table 8 G

DISTANCE VARIATION OF EFFECTS OF TMI ACCIDENT ON NONMANUFACTURING FIRM EXPANSION

Respondent's Distance From TMI (miles)	No. of Entities by Distance 1/	Attitudes Regarding Deterrence to Expansion in Each Radius (Answers as % of Entities)														
		0-5 Miles			5-10 Miles			10-15 Miles			15-20 Miles			Over 20 Miles		
		Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure	Would Deter	Would Not Deter	Not Sure
0-5	13	15.4	61.5	0	0	38.5	0	0	38.5	0	0	38.5	0	0	38.5	0
5-10	80	23.8	30.0	18.8	20.0	48.8	17.5	5.0	48.8	17.5	2.5	50.0	15.0	3.8	52.5	13.8
10-15	99	24.2	27.3	12.1	20.2	30.3	9.1	19.2	57.6	8.1	12.1	42.4	8.1	6.1	43.4	9.1
15-20	81	14.8	23.5	7.4	12.3	22.2	4.9	3.7	28.4	7.4	17.3	43.2	4.9	2.5	35.8	4.9
Over 20	151	13.2	31.1	9.3	10.6	28.5	7.3	7.9	31.1	8.6	4.0	35.8	6.6	15.2	60.2	6.0
TOTAL	424															

1/ Location by distance from TMI was known for 424 total sample responding entities. Two respondents to nonmanufacturing study did not report distance from TMI.

NOTE: 391 of the 426 total sample responding entities provided information used in this Table. Since the 35 non-respondents comprise only eight percent of the total sample, this small information gap would not significantly alter the results.

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

effect on their businesses. Three-quarters of all the entities felt this way. (See Table 8H.) Only five percent of the businesses perceived an adverse economic effect resulting from decontamination of TMI-2. An almost identical view of decontamination was held by the manufacturing sector (Section 8.3.2).

Of the eight nonmanufacturing divisions, services and retail trade seem to be the only ones concerned about an adverse economic effect, but even here the percentage is small.

There is a relatively significant share that was not sure about the economic effect. Those most uncertain were finance, retail trade and construction. In each of these divisions, about 20 percent of the entities were unsure of what the effect of decontamination would be on their businesses.

8.4.3 Reactivation of TMI Units Perceived as Not Significantly Affecting Nonmanufacturing

About 70 percent of the nonmanufacturing firms saw the reactivation of TMI-2 and TMI-2 as having no significant long-term economic impact on their businesses. The perceived impact of the reactivation of TMI-2 was slightly less positive than for TMI-1. (See Tables 8I and 8J.)

It is important to note that about nine percent of the entities viewed the reactivation of either unit negatively -- this was somewhat higher than was the case in manufacturing. Along the same vein, a smaller share of the nonmanufacturing sector perceived a positive long-term economic effect resulting from the re-start of either unit.

There are some differences among the nonmanufacturing divisions in their perception of the long-term economic effect of reactivation. For example, a greater share of the entities in the mining and finance divisions perceived positive effects than was the case in any of the other divisions. On the other hand, the retail trade and services divisions had a greater share perceiving a negative effect. This was probably a result of their experience in sustaining large losses as a result of the accident and the evacuation which followed.

Finally, the tables show that about 16 percent of the nonmanufacturing sector was not sure or offered no opinion about what the effect of reactivation would be.

Table 8 H

PERCEIVED ECONOMIC EFFECTS OF DECONTAMINATION OF UNIT 2 BY NONMANUFACTURING DIVISIONS

Division	Division Universe	Adverse Effect	% of Div. Universe	No Effect	% of Div. Universe	Not Sure	% of Div. Universe	Opinion Unknown	% of Div. Universe
Agriculture, etc.	314	0	0	306	97.5	0	0	8	2.5
Mining	26	0	0	25	96.2	0	0	1	3.8
Construction	3,201	14	0.4	2,567	80.2	610	19.1	10	0.3
Transportation & Public Utilities	837	12	1.4	789	94.3	36	4.3	0	0
Wholesale Trade	1,604	0	0	1,318	82.2	177	11.0	109	6.8
Retail Trade	6,158	443	7.2	4,312	70.0	1,285	20.9	118	1.9
Finance, etc.	1,499	8	0.5	1,052	70.2	420	28.0	19	1.3
Services	6,558	545	8.3	5,118	78.0	738	11.3	157	2.4
TOTAL NONMFG.	20,197	1,022	5.0	15,487	76.7	3,266	16.2	422	2.1

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 8 I

PERCEIVED LONG TERM ECONOMIC IMPACTS OF REACTIVATION OF UNIT 1

NONMANUFACTURING

Division	Division Universe	Positive	% of Div. Universe	Negative	% of Div. Universe	No Significant	% of Div. Universe	Not Sure	% of Div. Universe	Opinion Unknown	% of Div. Universe
Agriculture, etc.	314	8	2.5	16	5.1	290	92.4	0	0	0	0
Mining	26	6	23.1	0	0	19	73.1	0	0	1	3.8
Construction	3,201	185	5.8	168	5.2	2,092	65.4	746	23.3	10	0.3
Transportation & Public Utilities	837	10	1.2	24	2.9	754	90.1	49	5.8	0	0
Wholesale Trade	1,604	137	8.5	110	6.9	1,115	69.5	242	15.1	0	0
Retail Trade	6,158	287	4.7	556	9.0	3,855	62.6	1,143	18.6	317	5.1
Finance, etc.	1,499	278	18.5	135	9.0	918	61.3	155	10.3	13	0.9
Services	6,558	221	3.4	692	10.5	5,224	79.7	421	6.4	0	0
TOTAL NONMFG.	20,197	1,132	5.6	1,701	8.4	14,267	70.6	2,756	13.7	341	1.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 8 J

PERCEIVED LONG TERM ECONOMIC IMPACTS OF REACTIVATION OF UNIT 2
NONMANUFACTURING

Division	Division Universe	Positive	% of Div. Universe	Negative	% of Div. Universe	No Significant	% of Div. Universe	Not Sure	% of Div. Universe	Opinion Unknown	% of Div. Universe
Agriculture, etc.	314	8	2.5	8	2.5	290	92.5	0	0	8	2.5
Mining	26	6	23.1	0	0	19	73.1	0	0	1	3.8
Construction	3,201	186	5.8	168	5.2	1,818	56.8	304	9.5	725	22.6
Transportation & Public Utilities	837	10	1.2	24	2.9	754	90.1	49	5.8	0	0
Wholesale Trade	1,604	133	8.3	110	6.9	1,113	69.4	246	15.3	2	0.1
Retail Trade	6,158	299	4.8	675	11.0	3,757	61.0	1,291	21.0	136	2.2
Finance, etc.	1,499	278	18.6	135	9.0	918	61.2	155	10.3	13	0.9
Services	6,558	204	3.1	704	10.7	5,163	78.7	462	7.1	25	0.4
TOTAL NONMFG.	20,197	1,124	5.6	1,824	9.0	13,832	68.5	2,507	12.4	910	4.5

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

APPENDICES

Appendix A

OVERVIEW OF THE REGION SURROUNDING TMI

Physiography

The 20 mile radius for the TMI impact area covers 1,406 square miles and encompasses parts of seven contiguous counties in the southcentral part of the Commonwealth of Pennsylvania*. It is a part of the scenic Susquehanna River basin with mostly gentle elevations ranging from 1,000 to 2,000 feet. The landscape of the area consists of a picturesque mosaic of "Triassic" lowland, the "Great" valley, Piedmont and the Blue Ridge areas. The native materials of the area's soil include sedimentary sandstone, shale, limestone or dolomite, as well as igneous and metamorphic rocks. Many of the soils of the area have a high level of fertility which supports a prosperous agriculture industry.

The climate of the area is moderate. The mean annual temperature is around 53° Fahrenheit (with mean minimum January temperature of 24° and mean maximum July temperature of 87°). The length of the frost-free season is six months (180 days). Another favorable climatic condition is found in the annual precipitation. The mean annual rainfall is 45 inches; average snowfall is 25 inches. The area has an abundance of groundwater resources having an average yield of 20 to 80 gallons per minute.

Much of the land in the area has been classified by the U. S. Department of Agriculture as "prime agricultural land". This indicates good to excellent soil characteristics and favorable physiographic and climatological features. The yield per acre of the area's crops is higher than the state average. For instance, in 1978 the yield per acre for corn and wheat were 97 and 33 bushels respectively, or two and three bushels higher than the state average.

In spite of the fact that four of the five counties are part of designated Standard Metropolitan Statistical Areas (SMSA), the generalized land use pattern of the five-county area consists mainly of cropland and forests, with residential, industrial and commercial activities averaging less than ten percent

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*This overview presents information concerning the five counties of Cumberland, Dauphin, Lancaster, Lebanon and York. While small portions of Adams and Perry Counties are included within the 20 mile radius, the percentage of land area and populations affected are minor.

of the total land area. Table 1 shows that agricultural fields, namely cropland and pasture, cover over 60 percent of the five county area's total land. The proportion of open agricultural land is more than twice that of the state.

The area has other ample natural resources which have endowed it with the potential for sustaining and/or stimulating industrial production. Among these resources are industrial minerals which provide raw materials for local industries such as stone, clay, glass, and concrete products.

Demography

The pre-TMI accident population of the 20 mile radius has been estimated to be close to 653,000, with over one-half (52 percent) living within the ten to 15 mile radius. The population density is also greatest within the ten to 15 mile radius. See Table 2 and the following chart.

When viewed in terms of the total five county area, the 1978 population of the counties was 1,146,000, or 9.8 percent of the state's population. The total land area of the five counties is 3,291 square miles. The population density of 348 persons per square mile was substantially higher than the state as a whole. Nevertheless, the area's proportion of rural population is higher than the state's.

More people have been moving into the area during the 1970's than have been leaving it. With the exception of Dauphin County, the area's population has increased steadily since 1960. And during the period between 1970 and 1978, the five counties are estimated to have added 49,700 persons. This represents an increase rate of 4.6 percent, while the state as a whole has gradually lost population. Nearly one-half (45 percent) of this increase was the result of the in-migration of 22,300 new residents.

The area remains below the state average in proportion of non-white population, although it has been attracting more non-whites in recent years. The estimated non-white population in 1978 was only 4.5 percent of the area's total population, with Dauphin County having the largest share, 14.4 percent. The non-white population is found largely within the central cities.

The 1970 Census and the 1978 estimated figures for the area's household composition reveal both similarities and differences compared to the state and national averages. The area's household size in 1978 was smaller than in 1970 (it decreased

Table 1

GENERALIZED PATTERN OF LAND USE, 1974

	Percent of Total Acreage			
County	Cropland	Pastures	Forests	Other Land
Cumberland	51.0	9.0	34.0	6.0
Dauphin	34.0	4.0	56.0	5.0
Lancaster	72.0	4.0	19.0	6.0
Lebanon	45.0	14.0	34.0	7.0
York	49.0	8.0	31.0	12.0
5-County Area	53.2	7.2	32.2	7.4
Pennsylvania	23.1	6.0	63.3	7.0

SOURCE: Pennsylvania Department of Commerce, 1979 Pennsylvania Abstract: A Statistical Fact Book.

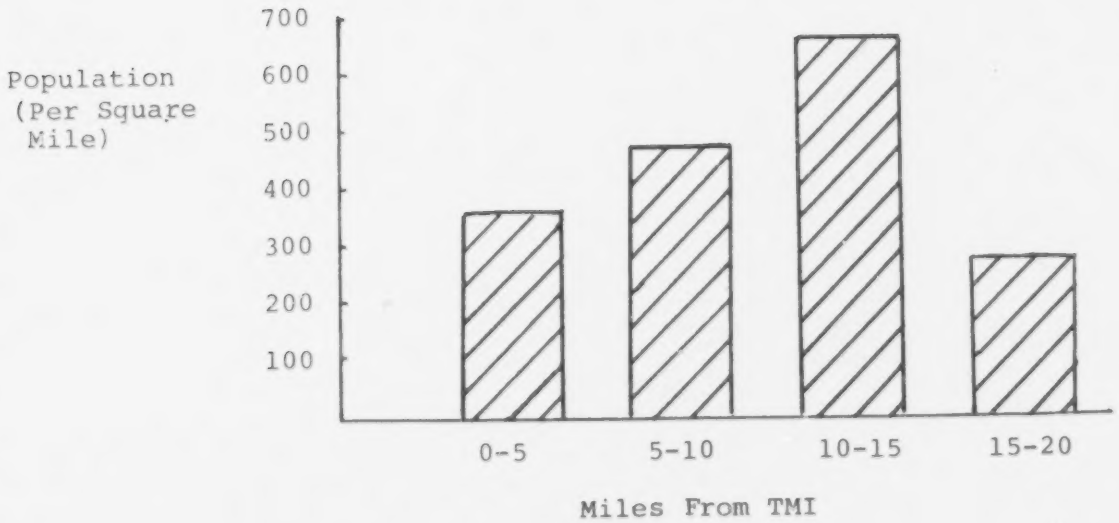
Table 2

POPULATION AND DENSITY DISTRIBUTION
BY RADII, 1978

Radius (Miles)	Population	%	Density (pop./sq. mi.)
0-5	37,842	4.5	353.1
5-10	116,973	18.2	487.8
10-15	334,305	52.0	654.0
15-20	163,794	25.4	286.1
Total	652,914	100.0	458.2

SOURCE: Based on data from the Pennsylvania Department of Commerce, 1980.

POPULATION DENSITY BY RADII



from about 3.1 to 2.8 persons). The proportion (2.6 percent) of persons not belonging to any kind of household (e.g., hospital patients, nursing home residents, prison inmates, etc.) was slightly higher than the state (2.1 percent).

Table 3 shows that the five county area's dependency index (53.1) is a bit higher than the state's (51.7), chiefly because of a higher proportion of children and youth (23.0 percent vs. 21.6 percent). Young dependents total over a quarter million (263,842) in the area. Cumberland County has the lowest dependency index (47.1).

Economy

The five county area's economy is characterized by diversification and a traditional emphasis on manufacturing. The area occupies a favorable position because of its abundant natural, human, and technological resources.

Measured by the available 1978 estimates, the area has a high rate of labor force participation; it exceeded the state rate by six percentage points (74 percent compared to 68 percent for the state).

According to 1970 Census figures, the occupational pattern of the area's labor force shows a high proportion of three major occupational groups: professional and managerial, craftsmen, and operatives. This pattern closely resembles that of the state and the nation as a whole. (See Table 4.)

Occupational differences exist among the five counties in the TMI area. Cumberland and Dauphin Counties lead in the proportion of their populations employed in white collar occupations. In contrast, Lancaster, Lebanon and York are largely blue collar counties. In 1970, these three counties had more than 50 percent of their total employed labor force in blue collar jobs.

The TMI area has experienced low unemployment rates. Since 1970, and even during the economic recession of 1975, the five counties maintained unemployment rates at substantially lower levels relative to the state and nation. (See Table 5.) This reflects the diversification of the area's economy and the presence of a wide range of employment opportunities.

The largest single source of employment in the area is manufacturing. In 1978, manufacturers in the five counties employed 31 percent of the total labor force (505,600). This constituted 13 percent of the total state manufacturing employment. The three leading manufacturers in 1978 were: 1) machinery, except electrical (11.5 percent); 2) fabricated metals

Table 3

DEPENDENCY INDEX, 1978

County	% Young Dependents (0-14 years)	% Productive Age (15-64 years)	% Aged Dependents (65 years and older)	Dependency Index
Cumberland	22.0	68.0	10.0	47.1
Dauphin	21.5	65.8	12.7	52.0
Lancaster	24.4	64.1	11.5	56.0
Lebanon	23.1	64.7	12.2	54.6
York	23.1	65.1	11.8	53.7
5-County Area	23.0	65.3	11.7	53.1
State	21.6	65.9	12.4	51.7

Source: Based on data from the Pennsylvania Bureau of Management Services, Estimates of the July, 1978 Total and Household Population for Counties By Age, Sex, and Race, November, 1979.

Table 4

PERCENT DISTRIBUTION OF OCCUPATIONAL GROUPS, 1970

County	White Collar		Blue Collar				
	Prof./ Manag.	Sales/ Clerical	Craftsm.	Operative	Labor	Farm	Service
Cumberland	30.4	17.5	19.1	15.7	/.0	2.9	7.4
Dauphin	25.5	16.7	21.3	18.3	7.6	1.6	9.0
Lancaster	19.9	12.4	24.1	23.3	6.2	7.7	6.4
Lebanon	16.0	12.5	25.1	26.8	7.2	4.2	8.2
York	20.3	13.3	24.3	27.1	6.4	2.8	5.8
5-County Area	22.3	14.5	22.8	22.3	6.9	3.8	7.4
Pennsylvania	22.9	14.7	22.6	22.8	7.1	2.0	7.9
U.S.	25.5	14.6	21.1	19.6	6.6	4.5	8.1

SOURCE: 1970 Population Census.

Table 5

UNEMPLOYMENT RATES, 1970-1980

County	Unemployment Rate (%)				
	1970	1975	1978	1979	June, 1980
Cumberland	2.7	5.7	4.3	4.5	5.5
Dauphin	2.9	6.2	5.3	5.3	5.8
Lancaster	2.6	6.3	4.5	4.6	6.0
Lebanon	2.8	7.8	5.9	6.1	6.4
York	3.0	7.7	5.0	5.0	7.1
5-County Area	2.8	6.7	5.0	5.1	6.0
Pennsylvania	4.4	8.3	6.9	6.9	8.0
U.S.	4.9	8.5	6.0	5.8	7.8

SOURCE: Pennsylvania Department of Labor and Industry, Office of Employment Security.

(ten percent); and 3) food and kindred products (7.6 percent). These industries accounted for over 29 percent of all manufacturing employment and 44 percent of the value of production which amounted to nearly $10 billion.

The retail trade industry is the second leading employer. Farming employes a very small fraction of the labor force in the five counties (0.3 percent in 1978). The agricultural strength of the area lies in livestock products including dairy products and poultry.

The area is one of the state's leading exporters of manufactured products. Recent data from the Pennsylvania Department of Commerce reveals that in 1978 there were 291 exporters in the five counties, or a little over 11 percent of the state's total. The total value of exports amounted to $595 billion, or about 15 percent of the state total. York County leads the state in the total value of exports.

Finance activities constitute another major component of the area's economy. As of 1977, the area had 207 financial institutions: 26 national banks (with $36,234,000 in capital); 21 state banks (with $35,548,000 in capital); five federal savings and loan associations (with $678,239,000 in assets); 18 state savings and loan associations (with $1,016,634,000 in assets); and 137 federal and state credit unions (with $163,313,000 in assets). The capital and assets combined amount to a total of nearly $2 billion.

The leading energy users in the area are in the manufacturing sector. In 1978, manufacturers in the five counties used 3,739 million kwh, or 11.2 percent of the total electric energy consumed in the state. The 1978 data also show that manufacturers of the area paid 45 percent of their total energy costs to electric utilities. Leading energy using industries are: primary metals; stone, clay and glass; fabricated metal products; and machinery, except electrical.

Socio-Economic Characteristics

The individuals and families of the five county area are relatively well off in terms of income, education, housing, health, recreation, communication and transportation, as compared to the rest of the state.

Throughout the 1970's, family and per capita income remained higher than the state average. The median family income in 1970 for the five counties combined was $9,957 compared to $9,558 for the state as a whole. In terms of "effective buying

income", the differences between the area and the state were even more pronounced. According to the 1976 figures, the area's median household income exceeded the state by $1,287, or nine percent, and the average per capita by $356, or by a little over six percent. These differentials were higher for the suburban population in the area.

The area, in general, spends less than the state average on public welfare due to the smaller proportion of its population who need assistance. During 1977-1978, the average per capita public assistance expenditure was $104, or about $91 less than the state average. During the same period, the share of needy persons was 3.5 percent of the total population, or only one-half of the state's figure.

In general, the residents of the area are slightly better educated than the state average. Among the age group of 25 years and older, over 55 percent completed high school, compared to less than 54 percent in the state as a whole. Educational attainment was much higher among the area's male population. In 1978, the proportion enrolled in high school and proportion of post-high school graduates were about the same for the area as for the state.

Surprisingly, the area's level of total expenditures for education during the academic years of 1976-1977, 1977-1978, and 1978-1979 fell short compared to the state average. For instance, during the 1976-1977 academic year, the five counties spent $1,500 per pupil, or $204 less than the state average. And the below state average expenditure per pupil of the area was again experienced during the subsequent academic year.

In 1977, among the 5,200 public high school graduates, 49 percent entered the job market directly after graduation compared to 53 percent for the state as a whole. However, close to one-fifth (20 percent) of the graduates entered business and technical schools for training and preparation for careers. This proportion was twice as high as that of the state. And the 1977 figures show the proportion of high school graduates who pursued college degree programs was lower (32 percent) than the state average (37 percent).

The five county area is the home of 17 private and public institutions of higher education with a total enrollment in excess of 35,000 students. There are also nine vocational and technical schools with a total enrollment of 9,135. These institutions are well equipped with modern facilities and resources that are needed to meet the requirements of adequate manpower training and development.

The general housing conditions in the area are about equal to the state and nation. The percentage of dilapidated housing units enumerated by the 1970 Census exceeded the state average (five percent compared to four percent). This condition is found largely in the inner portions of the area's central cities. Since 1970, concerted efforts have been undertaken by municipal authorities toward housing redevelopment and related urban programs. For instance, during the current year the counties of Lancaster and York and the cities of Harrisburg, Lancaster and York have received or are expected to receive $15,051,000 in community development grants from the Department of Housing and Urban Development to fuel the planning and implementation processes of these and other related programs.

Figures for 1970 rank the counties of the area among those with less crowded housing conditions and higher proportions of single family units. Data for this period indicates that three-fourths of the total housing units in the area were single family dwellings. Ninety-seven percent of these units were occupied, and over 70 percent were occupied by their owners.

In 1978-1979 there were 23 health institutions enumerated by the Pennsylvania Department of Health, including 18 general hospitals, two psychiatric hospitals, two rehabilitation hospitals, and one clinic. These constituted 9.4 percent of the total hospitals in the state and 11.2 percent of the total bed capacity. The total licensed and approved bed capacity of these hospitals in 1978-1979 was 6,669, or 290 beds per hospital, which is about 20 percent higher than the state average. (See Table 6.) The rate of beds per 1,000 population in 1976 was 5.8 compared to 4.9 for the state as a whole.

In terms of number of physicians per 100,000 population, data for 1975 shows that the area lags behind the state (141 compared to 171). The area did have 41 percent of all physicians in the state in 1975.

Outdoor recreation opportunities in the area are impressive. There are eight state parks which occupy a land area of over 13 square miles. During 1978 the estimated attendance at these parks approached three million. The area also has vast forest and game lands which cover about 190 square miles. During 1978, there were 19,300 small game animals released, 4,500 deer harvested, and almost 700,000 fish stocked for outdoor enjoyment of hunters and fishermen.

At the present time, four of the five counties of the area have TV stations. There are numerous radio stations, and a

Table 6

NUMBER OF HOSPITALS, BED CAPACITY, AND NUMBER OF EMPLOYEES, 1978-1979

County	No. of Hospitals	%	No. of Beds	Rate/1,000 Population (1976)	No. of Employees (1977)
Cumberland	4	17.4	850	3.7	1,593
Dauphin	5	21.7	2,152	7.1	5,096
Lancaster	6	26.1	1,413	3.1	3,052
Lebanon	5	21.7	1,339	12.1	1,939
York	3	13.0	915	3.2	2,419
5-County Area	23	100.0	6,669	5.8	14,099
State	245	-	58,623	4.9	-

SOURCE: Pennsylvania Departments of Health and Commerce.

number of local newspapers. Notable among the area's libraries are those of the educational institutions, and the state library in Harrisburg which has extensive holdings of general, reference, governmental documents, law, periodical, and microfilm materials. In addition, there were 35 local public libraries with holdings of 1,486,000 volumes in 1977.

The area's location has engendered an extensive roadway network amounting to nearly 11,000 miles. Over one percent are high speed interstate and turnpike roads, 40 percent are state and federal highways, and 59 percent are secondary and municipal roads. (See Table 7.) The interstate highway system (I-81, I-78, I-83 and I-76) makes the area accessible not only to other markets in the state but also to those in New York, New Jersey, Maryland, and New England. Conrail is the leading railroad line. It operates in all of the five counties. Trucking facilities for intra- and interstate services are also prevalent in the area.

Airports, both commercial and private, are found in the area. There are 21 commercial airports and many others which are used solely for private purposes. The largest airport is the Harrisburg International near Middletown.

The area has many cultural attractions. Among these are art galleries and museums, including the William Penn Museum in Harrisburg, the museum maintained by the Commonwealth. The historic Fulton Opera House in Lancaster is well known.

Government

The TMI area contains the Capitol of Pennsylvania. It has become the headquarters for a network of federal and state agencies. In addition, there are 232 municipalities, of which one-half are located within the 20 mile radius of the TMI plant (i.e., within the five counties which are the subject of this overview).

Data for 1976 indicate that local governments collected over $62 million in county and municipal taxes.

The presence of the three levels of government (federal, state and local) has provided the area with a major source of employment and income. As of July, 1979, the total state salaried employees working throughout the area was 23,600, or 23.5 percent of the state's total (100,500). There were almost twice as many state employees as those of the federal and local governments.

Table 7

SELECTED TRANSPORTATION CHARACTERISTICS, 1977

County	Highway Mileage			Airports		Motor Vehicles Registered (Dec.)
	Interstate/ Turnpike	State/ Federal	Secondary/ Municipal	Commercial	Private [1]	
Cumberland	41.1	650.0	903.7	2	8	124,717
Dauphin	27.6	609.8	1,043.5	3	9	152,628
Lancaster	30.0	1,322.3	2,119.2	4	15	218,230
Lebanon	23.7	436.9	592.9	5	6	67,979
York	39.6	1,277.9	1,676.0	7	21	198,879
5-County Area	162.0	4,296.9	6,335.3	21	59	762,433 (11% of the State total)

[1] Includes heliports

SOURCE: Pennsylvania Departments of Commerce and Transportation.

The area's government employment (all types) constitutes a significant source of the total personal earnings. Table 8 shows that in 1977, this proportion was over 15 percent.

Table 8

PERSONAL EARNINGS FROM GOVERNMENT EMPLOYMENT, 1977

Labor Market Area	Government Employment Earnings	% of Total Personal Earnings
Harrisburg	$ 675,383,000	24.7
Lancaster	$ 143,959,000	7.8
Lebanon	$ 85,670,000	17.1
York	$ 138,731,000	7.9
Area	$1,043,743,000	15.3
State	$8,299,377,000	13.2

Based on raw data from the Pennsylvania Department of Commerce and the Pennsylvania Bureau of Employment Security.

Appendix B

MANUFACTURING STUDY DESIGN

To determine the impacts of the TMI accident for this final report, the Pennsylvania Department of Commerce's Bureau of Statistics, Research and Planning undertook the collection of data from a large sample of manufacturing establishments within an approximate 20 mile radius of the TMI plant. This approximate 20 mile radius included all of Dauphin, Cumberland and York Counties and those parts of Adams, Lancaster, Lebanon and Perry Counties within the 20 mile radius. The collection of information took place principally during the months of April and May of 1980. The data was collected by use of a mailed questionnaire and subsequent follow-up telephone calls when necessary.

The purpose of this effort was to obtain information useful in evaluating the year-long effect of the TMI accident on manufacturing and to assess the degree of recovery from its economic effects. The study covered the 12 month period after the TMI accident, from March 30, 1979 through March, 1980. Data collection replicated fairly closely the previous May, 1979 effort to obtain information used in past interim reports concerning the economic impacts of the accident on manufacturing. This time, however, the duration of various impacts during the year-long period was examined as well as the variations of these effects with distance from the plant.

The spring, 1980 data collection effort sought information from the same sample and universe of manufacturing establishments as the spring, 1979 effort. A sample of 383 manufacturing establishments was contacted from a total of 1,141 establishments within the universe of possible establishments in the approximate 20 mile radius (see Table 1). The universe of establishments provided employment to over 101,700 workers, according to 1978 employment figures.

The sample of manufacturers consisted of all establishments with 100 or more employees, almost all establishments of SIC 20 (food and kindred products), and a random sample of the remaining manufacturing establishments, consisting of 19 percent of those with 20 to 99 employees and five percent of those with zero to 19 employees. It is evident from the above that there was a special emphasis placed upon the food and kindred products industry (SIC 20) in order to thoroughly examine the TMI accident's impact on food processing plants.

Table 1

MANUFACTURING STUDY
UNIVERSE AND SAMPLE

	Number	%
Universe		
Establishments	1,141	
Employment (1978)	101,749	
Sample Contacted		
Establishments	383	
Percent of Establishments in Universe		33.6
Sample Responding		
Establishments	348	
Percent of Establishments Contacted		90.9
Percent of Establishments in Universe		30.5
Employment Represented (1978)	62,794	
Percent of Employment in Universe		61.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

There was an excellent response -- 348 establishments (91 percent of the 383 contacted) replied, resulting in a 31 percent sample of establishments, accounting for almost 62 percent of the universe of employment. (See Table 1.)

Table 2 depicts the manufacturing universe, the sample contacted, and the sample responding to the Department of Commerce study. Data for the individual SIC categories are presented for the number of establishments and for 1978 employment in both the universe and the sample responding. The data is presented according to five broad groupings in addition to SIC 20. The groupings represent combinations of certain two-digit SIC categories.

The groupings were a result of a review of the employment size characteristics of the manufacturing universe as well as the ability to combine "similar activity" type industries. The Commerce Department's earlier study of May, 1979 had presented manufacturing data for only SIC 20 and "all other SIC's"; for 1980 an attempt was made to reveal greater detail in the information, and that is why the groupings were utilized. Three groups were based upon first selecting industries comprising large schares of the manufacturing employment in the universe -- at least 6,000 employees. Then combinations were made where it was felt that the industries were closely related, and where the resulting combined employment would exceed 12,000 employees and the combined establishments would exceed 100. Then another criteria was also applied -- that the combined number of establishments in the response sample had to exceed at least 20 percent of the corresponding number in the universe and the combined employment in the response sample was at least 60 percent of the corresponding employment in the universe. The three combinations which satisfied these requirements were primary metals and fabricated metals, machinery and electrical machinery, and textile mill and apparel products.

Food and kindred products were left as a separate and distinct category. The balance of the durable goods and non-durable goods two-digit categories each became additional combinations.

Table 2 shows that, in most cases, 80 to 100 percent of the establishments contacted responded. And there was a slightly greater overall response by the establishments in the non-durable group. So there was a higher share of the universe establishments represented by the non-durables response (39.7 percent) than in the durables (21.6 percent). The percentage of the universe employment represented by the durable and non-durable goods response was about the same (about 61 percent).

Table 2

MANUFACTURING STUDY

ESTABLISHMENTS AND 1978 EMPLOYMENT IN UNIVERSE AND SAMPLE, BY 2-DIGIT SIC

Groups & 2-Digit SIC Categories	Universe			Sample Contacted	
	Number	% of Total Mfg.	Employment	Number	% of Group Universe
Primary & Fabricated Metals	157	13.7	17,543	46	29.3
SIC 33 Primary Metal Industries	39	3.4	7,536	15	(38.4)
SIC 34 Fabricated Metal Industries	118	10.3	10,007	31	(26.3)
Machinery, incl. Electrical	209	18.3	23,122	53	25.4
SIC 35 Machinery, except Electrical	160	14.0	14,750	31	(19.4)
SIC 36 Electrical & Electronic Machinery & Equipment	49	4.3	8,372	22	(44.9)
All Other Durable Goods	213	18.7	17,712	43	20.2
SIC 24 Lumber & Wood Products exc. Furniture	60	5.3	1,528	9	(15.0)
SIC 25 Furniture & Fixtures	34	3.0	2,414	7	(20.6)
SIC 32 Stone, Clay, Glass, & Concrete Products	54	4.7	4,013	11	(20.4)
SIC 37 Transportation Equip.	22	1.9	7,415	9	(40.9)
SIC 38 Measuring, Photographic & Medical Equipment	14	1.2	1,329	3	(21.4)
SIC 39 Misc. Manufacturing	29	2.5	1,013	4	(13.8)
TOTAL DURABLE GOODS	579	50.7	58,377	142	24.5
Food & Kindred Products (SIC 20)	148	13.0	12,467	138	93.2
Textile Mill & Apparel Products	117	10.3	13,327	39	33.3
SIC 22 Textile Mill Products	25	2.2	6,360	13	(52.0)
SIC 23 Apparel & Other Finished Products	92	8.1	6,967	26	(28.3)
All Other Nondurable Goods	297	26.0	17,578	64	21.5
SIC 21 Tobacco Manufacturers	12	1.1	497	3	(25.0)
SIC 26 Paper & Allied Products	40	3.5	4,046	14	(35.0)
SIC 27 Printing, Publishing & Allied Products	171	15.0	5,797	24	(14.0)
SIC 28 Chemical & Allied Products	14	1.2	795	2	(14.3)
SIC 29 Petroleum Refining	7	0.6	301	2	(28.6)
SIC 30 Rubber & Misc. Plastic Products	28	2.5	2,218	5	(17.9)
SIC 31 Leather & Leather Products	25	2.2	3,924	14	(56.0)
TOTAL NONDURABLE GOODS	562	49.3	43,372	241	42.9
TOTAL MANUFACTURING	1,141	100.0	101,749	383	33.6

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 2 (continued)

MANUFACTURING STUDY

ESTABLISHMENTS AND 1978 EMPLOYMENT IN UNIVERSE AND SAMPE, BY 2-DIGIT SIC

Groups & 2-Digit SIC Categories	Sample Responding				
	Number	% of Sample Contacted	% of Group Universe	Employment	% of Group Universe Empl.
Primary & Fabricated Metals	42	91.3	26.8	10,570	60.3
SIC 33	13	(86.7)	(33.3)	2,895	(38.4)
SIC 34	29	(93.5)	(24.6)	7,675	(76.7)
Machinery, including Electrical	45	84.9	21.5	15,022	65.0
SIC 35	29	(93.5)	(18.1)	10,249	(69.5)
SIC 36	16	(72.7)	(32.7)	4,773	(57.0)
All Other Durable Goods	38	88.4	17.8	10,225	57.7
SIC 24	9	(100.0)	(15.0)	643	(42.1
SIC 25	6	(85.7)	(17.6)	1,616	(66.9)
SIC 32	11	(100.0)	(20.4)	2,270	(56.6)
SIC 37	7	(77.8)	(31.8)	4,425	(59.7)
SIC 38	3	(100.0)	(21.4)	1,256	(94.5)
SIC 39	2	(50.0)	(6.9)	15	(1.5)
TOTAL DURABLE GOODS	125	88.0	21.6	35,817	61.4
Food & Kindred Products (SIC 20)	125	90.6	84.5	5,790	46.4
Textile Mill & Apparel Products	36	92.3	30.8	9,429	70.8
SIC 22	11	(84.6)	(44.0)	5,700	(89.6)
SIC 23	25	(96.2)	(27.2)	3,729	(53.5)
All Other Nondurable Goods	62	96.9	20.9	11,758	66.9
SIC 21	3	(100.0)	(25.0)	334	(67.2)
SIC 26	14	(100.0)	(35.0)	2,923	(72.2)
SIC 27	24	(100.0)	(14.0)	4,022	(69.5)
SIC 28	2	(100.0)	(14.3)	132	(16.6)
SIC 29	2	(100.0)	(28.6)	249	(82.7)
SIC 30	5	(100.0)	(17.9)	1,700	(76.6)
SIC 31	12	(85.7)	(48.0)	2,398	(61.1)
TOTAL NONDURABLE GOODS	223	92.5	39.7	26,977	62.2
TOTAL MANUFACTURING	348	90.9	30.5	62,794	61.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

The best sample obtained in terms of employment was in textile mill and apparel products (71 percent). The poorest was in food (with just over 46 percent).

For analysis purposes, it was necessary to extrapolate the response data to the universe level. This was done by inflating the data from the responses as arranged according to seven employment size groups within each of the two-digit categories. Generally stated, the extrapolation of the respondents' data to the universe was obtained by using either the ratio of total universe employment for each size group and category to the employment in the corresponding responding establishments or the ratio for the number of establishments in the same way. Hence, the response data was inflated by employment size group and SIC to a level corresponding to the size of employment or number of establishments at the universe level. Data extrapolation was necessary in order to estimate the economic impacts for all establishments and all employment in the manufacturing universe.

The universe of manufacturing establishments and employment for the approximate 20 mile radius by the seven employment size groups and 2-digit SIC's is shown in Table 3. The most numerous establishments are those having less than 100 employees (935); the least numerous are those having over 500 employees (34), although they account for over 40 percent of the total employment in the universe. The largest number of establishments with high employment are found in SIC 20 (food and kindred products), SIC 35 (machinery, except electrical), and SIC 34 (fabricated metal products).

Past analysis of the impacts of TMI has indicated that it is useful to disaggregate the data into that which applies to small and large establishments. In order to do so, the data by two-digit SIC was grouped according to that for establishments having less than 100 employees and those with 100 employees or more. This breakdown for the universe of manufacturing is shown in Table 4. It can be seen that small plants account for the largest share of the manufacturing establishments -- 82 percent. In every SIC, there are more small establishments than large ones. But the remaining 18 percent of large plants contain almost 80 percent of the overall manufacturing universe employment. But in several cases (SIC's 21, 23, 24, 27 and 39) the small establishments account for over one-third of the total employment. And the number of small and large establishments is about the same for durable and non-durable industries.

The distribution of the study's responding establishments and corresponding employment according to the seven employment

Table 3

MANUFACTURING STUDY
NUMBER OF ESTABLISHMENTS AND EMPLOYMENT IN
MANUFACTURING UNIVERSE BY EMPLOYMENT SIZE GROUPS

Number of Establishments

2-Digit SIC	Employment Size Groups							
	0	1-19	20-99	100-199	200-499	500-999	1000+	Total
20	6	64	56	10	8	3	1	148
21	1	6	4	0	1	0	0	12
22	0	5	10	4	2	2	2	25
23	1	13	55	17	6	0	0	92
24	9	27	21	2	1	0	0	60
25	3	12	14	2	2	1	0	34
26	0	9	19	8	3	0	1	40
27	26	99	31	7	7	1	0	171
28	0	7	5	1	1	0	0	14
29	0	5	1	0	1	0	0	7
30	1	13	10	3	0	0	1	28
31	0	6	8	3	8	0	0	25
32	3	26	16	4	3	1	1	54
33	0	16	13	1	7	1	1	39
34	3	47	44	10	10	3	1	118
35	12	91	37	6	10	1	3	160
36	2	11	15	4	14	3	0	49
37	0	8	4	2	3	3	2	22
38	1	10	2	0	0	0	1	14
39	4	18	5	1	0	1	0	29
TOTAL MFG	72	493	370	85	87	20	14	1,141

1978 Employment

2-Digit SIC	Employment Size Groups							
	0	1-19	20-99	100-199	200-499	500-999	1000+	Total
20	0	521	2,638	1,428	2,311	1,950	3,619	12,467
21	0	37	154	0	306	0	0	497
22	0	29	539	561	550	1,453	3,228	6,360
23	0	95	2,769	2,540	1,563	0	0	6,967
24	0	160	847	320	201	0	0	1,528
25	0	117	641	222	488	946	0	2,414
26	0	72	1,016	1,158	712	0	1,088	4,046
27	0	609	1,379	952	2,355	502	0	5,797
28	0	67	176	110	442	0	0	795
29	0	20	37	0	244	0	0	301
30	0	95	458	416	0	0	1,249	2,218
31	0	63	438	404	3,019	0	0	3,924
32	0	249	663	536	1,016	512	1,037	4,013
33	0	161	771	123	2,244	751	3,486	7,536
34	0	369	2,011	1,371	3,075	1,890	1,291	10,007
35	0	754	1,620	811	2,923	956	7,686	14,750
36	0	108	645	677	4,676	2,266	0	8,372
37	0	97	205	312	951	2,904	2,946	7,415
38	0	73	57	0	0	0	1,199	1,329
39	0	118	230	140	0	525	0	1,013
TOTAL MFG	0	3,814	17,294	12,081	27,076	14,655	26,829	101,749

Source: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 4
MANUFACTURING STUDY
UNIVERSE OF ESTABLISHMENTS AND 1978 EMPLOYMENT

Group & 2-Digit SIC Categories	Small Establishments (0-99)		Large Establishments (100+)		Small Establishments	
	Number	Employment	Number	Employment	Number % of Group Universe	Employment % of Group Universe
Primary & Fabricated Metals	123	3,312	34	14,231	78.3	18.9
SIC 33 Primary Metal Industries	29	932	10	6,604	(74.4)	(12.4)
SIC 34 Fabricated Metal Industries	94	2,380	24	7,627	(79.7)	(23.8)
Machinery, including Electrical	168	3,127	41	19,995	80.4	13.5
SIC 35 Machinery, except Electrical	140	2,374	20	12,376	(87.5)	(16.1)
SIC 36 Electrical & Electronic Machinery & Equipment	28	753	21	7,619	(57.1)	(9.0)
All other Durable Goods	183	3,457	30	14,255	85.9	19.5
SIC 24 Lumber & Wood Products, excluding Furniture	57	1,007	3	521	(95.0)	(65.9)
SIC 25 Furniture & Fixtures	29	758	5	1,656	(85.3)	(31.4)
SIC 32 Stone, Clay, Glass & Concrete Products	45	912	9	3,101	(83.3)	(22.7)
SIC 37 Transportation Equipment	12	302	10	7,113	(54.5)	(4.1)
SIC 38 Measuring, Photographic & Medical Equipment	13	130	1	1,199	(92.9)	(9.8)
SIC 39 Miscellaneous Manufacturing Industries	27	348	2	665	(93.1)	(34.3)
TOTAL DURABLE GOODS	474	9,896	105	48,481	81.9	17.0
Food & Kindred Products (SIC 20)	126	3,159	22	9,308	85.1	25.3
Textile Mill & Apparel Products	84	3,432	33	9,895	71.8	25.8
SIC 22 Textile Mill Products	15	568	10	5,792	(60.0)	(8.9)
SIC 23 Apparel & Other Finished Products	69	2,864	23	4,103	(75.0)	(41.1)
All other Nondurable Goods	251	4,621	46	12,957	84.5	26.3
SIC 21 Tobacco Manufacturers	11	191	1	306	(91.7)	(38.4)
SIC 26 Paper & Allied Products	28	1,088	12	2,958	(70.0)	(26.9)
SIC 27 Printing, Publishing & Allied Products	156	1,988	15	3,809	(91.2)	(34.3)
SIC 28 Chemical & Allied Products	12	243	2	552	(85.7)	(30.6)
SIC 29 Petroleum Refining	6	57	1	244	(85.7)	(18.9)
SIC 30 Rubber & Miscellaneous Plastic Products	24	553	4	1,665	(85.7)	(24.9)
SIC 31 Leather & Leather Products	14	501	11	3,423	(56.0)	(12.8)
TOTAL NONDURABLE GOODS	461	11,212	101	32,160	82.0	25.9
TOTAL MANUFACTURING	935	21,108	206	80,641	81.9	20.7

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

size groups and two-digit SIC's is shown in Table 5. Given the nature of the sample described earlier, and looking at the total responses for manufacturing, a good response was obtained (compare Table 5 with Table 3) although there was not a 100 percent response from establishments having 100 or more employees (about 80 percent).

The disaggregation of the responses according to small and large establishments and their corresponding employment is shown in Table 6. With the exception of food and kindred products, most of the responses were provided by the larger establishments; this is a reflection of the nature of the sample. Also, ignoring the responses for SIC 20, durable goods industries provided more responses than non-durables. The employment represented by the responses from large establishments was ten times that represented by the smaller plants.

Table 5

MANUFACTURING STUDY
RESPONDING ESTABLISHMENTS, NUMBER
AND EMPLOYMENT, BY EMPLOYMENT SIZE GROUPS

Number of Establishments

2-Digit SIC	Employment Size Groups							
	0	1-19	20-99	100-199	200-499	500-999	1000+	Total
20	5	57	48	9	6	0	0	125
21	0	1	1	0	1	0	0	3
22	0	0	3	2	2	2	2	11
23	0	0	5	16	4	0	0	25
24	0	2	4	2	1	0	0	9
25	0	0	2	1	2	1	0	6
26	0	0	3	7	3	0	1	14
27	1	3	5	7	7	1	0	24
28	0	0	1	1	0	0	0	2
29	0	1	0	0	1	0	0	2
30	0	0	1	3	0	0	1	5
31	0	1	4	1	6	0	0	12
32	0	0	4	4	2	0	1	11
33	0	3	3	0	6	1	0	13
34	0	0	7	8	10	3	1	29
35	1	3	8	5	9	1	2	29
36	0	1	2	0	11	2	0	16
37	0	0	0	2	2	2	1	7
38	0	0	2	0	0	0	1	3
39	0	2	0	0	0	0	0	2
TOTAL MFG	7	74	103	68	73	13	10	348

1978 Employment

2-Digit SIC	Employment Size Groups							
	0	1-19	20-99	100-199	200-499	500-999	1000+	Total
20	0	461	2,294	1,247	1,788	0	0	5,790
21	0	5	23	0	306	0	0	334
22	0	0	181	288	550	1,453	3,228	5,700
23	0	0	242	2,372	1,115	0	0	3,729
24	0	10	112	320	201	0	0	643
25	0	0	71	111	488	946	0	1,616
26	0	0	127	996	712	0	1,088	2,923
27	0	8	227	930	2,355	502	0	4,022
28	0	0	22	110	0	0	0	132
29	0	5	0	0	244	0	0	249
30	0	0	35	416	0	0	1,249	1,700
31	0	13	239	122	2,024	0	0	2,398
32	0	0	155	536	542	0	1,037	2,270
33	0	14	230	0	1,900	751	0	2,895
34	0	0	326	1,093	3,075	1,890	1,291	7,675
35	0	29	359	676	2,469	956	5,760	10,249
36	0	10	80	0	3,498	1,185	0	4,773
37	0	0	0	312	589	1,935	1,589	4,425
38	0	0	57	0	0	0	1,199	1,256
39	0	15	0	0	0	0	0	15
TOTAL MFG	0	570	4,780	9,529	21,856	9,618	16,441	62,794

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 6

MANUFACTURING STUDY
RESPONDING ESTABLISHMENTS AND 1978 EMPLOYMENT

Group & 2 Digit SIC Categories	Small Establishments (0-99) Number	Small Establishments (0-99) Employment	Large Establishments (100+) Number	Large Establishments (100+) Employment
Primary & Fabricated Metals	13	570	29	10,000
SIC 33 Primary Metal Industries	6	244	7	2,651
SIC 34 Fabricated Metal Industries	7	326	22	7,349
Machinery, including Electrical	15	478	30	14,544
SIC 35 Machinery, except Electrical	12	388	17	9,861
SIC 36 Electrical & Electronic Machinery & Equip.	3	90	13	4,683
All other Durable Goods	16	420	22	9,805
SIC 24 Lumber & Wood Products, exc. Furniture	6	122	3	521
SIC 25 Furniture & Fixtures	2	71	4	1,545
SIC 32 Stone, Clay, Glass & Concrete Products	4	155	7	2,115
SIC 37 Transportation Equipment	0	0	7	4,425
SIC 38 Measuring, Photographic & Medical Equip.	2	57	1	1,199
SIC 39 Miscellaneous Manufacturing Industries	2	15	0	0
TOTAL DURABLE GOODS	44	1,468	81	34,349
Food & Kindred Products (SIC 20)	110	2,755	15	3,035
Textile Mill & Apparel Products	8	423	28	9,006
SIC 22 Textile Mill Products	3	181	8	5,519
SIC 23 Apparel & other Finished Products	5	242	20	3,487
All other Nondurable Goods	22	704	40	11,054
SIC 21 Tobacco Manufacturers	2	28	1	306
SIC 26 Paper & Allied Products	3	127	11	2,796
SIC 27 Printing, Publishing & Allied Products	9	235	15	3,787
SIC 28 Chemical & Allied Products	1	22	1	110
SIC 29 Petroleum Refining	1	5	1	244
SIC 30 Rubber & Misc. Plastic Products	1	35	4	1,665
SIC 31 Leather & Leather Products	5	252	7	2,146
TOTAL NONDURABLE GOODS	140	3,882	83	23,095
TOTAL MANUFACTURING	184	5,350	164	57,444

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Appendix C

NONMANUFACTURING
STUDY DESIGN

To determine the impacts of the TMI accident for this final report, the Pennsylvania Department of Commerce's Bureau of Statistics, Research and Planning undertook the collection of data from a sample of nonmanufacturing firms within a six county area surrounding the TMI plant. These counties included Dauphin, Cumberland, Lancaster, Lebanon, Perry and York. The collection of information took place principally during the months of April and May of 1980. The data was collected by use of a mailed questionnaire and subsequent follow-up telephone calls when necessary.

It should be pointed out that while manufacturing activity could be identified at the municipality level (and hence information prepared concerning TMI impacts within an approximate 20 mile radius), no such similar identification capability existed for the nonmanufacturing sector. Thus, it was necessary to derive the nonmanufacturing impact analysis information through contacts made from county listings of nonmanufacturing entities provided by the Office of Employment Security in the Pennsylvania Department of Labor and Industry.

The purpose of the nonmanufacturing analysis effort was the same as that for manufacturing -- to obtain information useful in evaluating the year-long economic effects of the TMI accident and to assess the degree of recovery from these impacts. Information was sought covering the entire 12 month period following the accident -- from March 30, 1979 through March, 1980. In addition, the duration of various impacts during the year-long period was examined as well as the variations of these effects with distance from the plant.

The previous assessment of TMI's effects on the nonmanufacturing sector was made in September, 1979. In spring of 1980 a total sample of 550 nonmanufacturing entities were contacted, generally the same entities contacted in September, 1979. An entity is the total county business operation for a company in that county regardless of the number of establishments.

The sample of 550 entities contacted were selected from a total of 20,197 possible entities in the six county universe. This represented close to three percent of all possible entities (see Table 1). This universe of nonmanufacturing firms provided employment to over 267,000 workers, according to 1978

Table 1

NONMANUFACTURING STUDY
UNIVERSE AND SAMPLE

	Number	%
Universe		
Number of Entities	20,197	
Employment (1978)	267,032	
Sample Contacted		
Entities	550	
Percent of Entities in Universe		2.7
Sample Responding		
Entities	426	
Percent of Entities Contacted		77.5
Percent of Entities in Universe		2.1
Employment Represented (1978)	60,905	
Percent of Employment in Universe		22.8

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

employment figures. The 267,032 universe of employment represented the employment in all establishments which were part of the 20,197 entities. The sample of 550 nonmanufacturing entities contacted consisted of 100 percent of the entities employment 250 or more workers, 25 percent of these in the 100 to 249 employee range, ten percent of these employing 20 to 99, and one percent of those with zero to 19 employees.

There was a very good response -- 426 entities responded (77 percent of the 550 contacted) -- resulting in a two percent sample of responding entities. This sample response accounted for about 23 percent of the total universe of employment. Table 2 depicts the nonmanufacturing universe and sample by eight two-digit SIC divisions. This assignment of the nonmanufacturing entities was based upon the Standard Industrial Classification Code and identified each entity according to the major activity which it performs. The universe did not include firms representing self-employed individuals. And the 314 entities included under the agriculture, forestry and fisheries division represent only large firms (i.e., those employing ten or more workers in a 20 week period or paying in cash at least $20,000 to employees in one quarter) plus entities engaged in forestry, fishing, or agricultural services. The sample responding among each of the eight divisions varied from 66 to 100 percent (mining) of the entities contacted. No less than 1.6 percent (construction) of the universe in any division was represented by the sample responding. On the other hand, mining had a high representation -- nearly 15 percent of the universe.

An examination of the distribution of the universe of entities and their associated employment among the eight nonmanufacturing divisions reveals that retail trade and services account for the largest share of the number of entities and employment. Services lead in the number of entities while retail trade leads in the size of employment. Correspondingly, these two divisions contain the largest number of responding entities and employment.

For analysis purposes, it was necessary to extrapolate the response data to the universe level. Extrapolation of the data was necessary in order to estimate the economic impacts for all entities and employment in the nonmanufacturing universe. Extrapolation was done by inflating the data from the responses as arranged according to four employment size groups within each of the two-digit divisions, and for each of the eight nonmanufacturing divisions. Generally, the extrapolation was obtained by using either the ratio of total universe employment in each size group and division to the

Table 2

NONMANUFACTURING STUDY
ENTITIES AND 1978 EMPLOYMENT IN UNIVERSE AND SAMPLE, BY 2-DIGIT SIC DIVISIONS

2-Digit SIC Division	Name	Universe			Sample Contacted	
		Number	Share of Total (%)	Employment	Number	% of Division Universe
01 - 09	Agriculture, Forestry & Fisherries	314	1.6	2,885	8	2.5
10 - 14	Mining	26	0.1	1,402	4	15.4
15 - 17	Construction	3,201	15.9	23,798	59	1.8
40 - 49	Transportation & Public Utilities	837	4.1	26,841	40	4.8
50 - 51	Wholesale Trade	1,604	7.9	25,469	56	3.5
52 - 59	Retail Trade	6,158	30.5	91,805	190	3.1
60 - 69	Finance, Insurance, & Real Estate	1,499	7.4	21,633	43	2.9
70 - 89	Services	6,558	32.5	73,199	150	2.3
TOTAL	NONMANUFACTURING	20,197	100.0	267,032	550	2.7

Table 2 (Cont.)

2-Digit SIC Division	Sample Responding				
	Number	% of Universe	% of Sample Contacted	Employment	% of Division Universe
01 - 09	7	2.2	87.5	277	4.6
10 - 14	4	15.4	100.0	223	15.9
15 - 17	50	1.6	84.7	2,139	9.0
40 - 49	29	3.5	72.5	6,235	23.2
50 - 51	46	2.9	82.1	3,798	14.9
52 - 59	125	2.0	65.8	17,018	18.5
60 - 67	42	2.8	97.7	8,798	40.7
70 - 89	123	1.9	82.0	22,417	30.6
TOTAL NONMANUFACTURING	426	2.1	77.5	60,905	22.8

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

employment in the corresponding respondent size group and division or the ratio of the number of entities in the same way. Extrapolation primarily used the ratio of entities; the exception being values of lost man-hours, wages and sales.

The universe of nonmanufacturing entities and employment for the six county area by the four employment size groups and eight divisions is shown in Table 3. The largest number of entities (the smallest size group) employ less than 19 workers. But the total employment is more evenly divided among the four employment size groups, especially among those employing less than 100 persons.

Past analysis of the impacts of TMI has indicated that it is useful to break down the information into that which applies to small and large firms. In order to do so, the data by two-digit SIC division was grouped according to those with 20 employees or more. This breakdown for the nonmanufacturing universe is shown in Table 4. The most significant fact is that 87.4 percent of the entities are small. The mining industry is an exception; here, 42 percent of the entities are small. The small entities employ around 30 percent of the total employment in the universe. A very small share of the total employment in the mining and transportation and public utilities divisions is found in small firms.

The allocation of this study's responding entities and employment according to the four employment size groups and eight SIC divisions is shown on Table 5. There was a response within nearly every size group and division. There are no large entities (250 employees) in the agriculture or mining divisions, hence there were no responses. Remembering the nature of the sample described earlier, almost 70 percent of the goals of the sample sought were attained for every size group, including over 83 percent of those in the 20 to 99 size employment group. The bulk of the employment associated with the response was in the 250 or more size group.

The breakdown of the responses according to small and large entities is shown in Table 6. Given the nature of the sample (especially the one percent sample sought for small entities), it is not surprising that the largest number of responses came from large entities -- 304 of the 426 responding entities. Almost 60 percent of responses from both small and large entities were from the combined retail trade and services divisions.

Table 3

NONMANUFACTURING STUDY
NUMBER OF ENTITIES AND EMPLOYMENT IN
NONMANUFACTUPING UNIVERSE BY EMPLOYMENT SIZE GROUPS

Number of Entities

2-Digit SIC Divisions	Employment Size Groups 0-19	20-99	100-249	250+	Total
01 - 09	279	32	3	0	314
10 - 14	11	12	2	1	26
15 - 17	2,942	237	20	2	3,201
40 - 49	625	154	40	18	837
50 - 51	1,306	264	29	5	1,604
52 - 59	5,182	847	95	34	6,158
60 - 67	1,343	115	30	11	1,499
70 - 89	5,975	479	72	32	6,558
TOTAL NONMFG.	17,663	2,140	291	103	20,197

1978 Employment

2-Digit SIC Divisions	Employment Size Groups 0-19	20-99	100-249	250+	Total
01 - 09	1,125	1,249	511	0	2,885
10 - 14	125	576	316	385	1,402
15 - 17	11,562	8,676	2,909	651	23,798
40 - 49	3,374	6,421	5,768	11,278	26,841
50 - 51	7,820	10,459	4,241	2,949	25,469
52 - 59	26,499	32,668	13,948	18,690	91,805
60 - 67	4,744	4,956	4,295	7,638	21,633
70 - 89	23,408	18,887	10,919	19,995	73,199
TOTAL NONMFG.	78,657	83,882	42,907	61,586	267,032

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 4

NONMANUFACTURING STUDY
UNIVERSE OF ENTITIES AND 1978 EMPLOYMENT BY
SMALL AND LARGE EMPLOYMENT SIZE GROUPS

2-Digit SIC Divisions	Name	Small Entities (0-19)		Large Entities (20+)		Small Entities	
		Number	Employment	Number	Employment	Number % Div. Universe	Employment % Div. Universe
01 - 09	Agriculture, Forestry & Fisherries	279	1,125	35	1,760	88.9	39.0
10 - 14	Mining	11	125	15	1,277	42.3	8.9
15 - 17	Construction	2,942	11,562	259	12,236	91.9	48.6
40 - 49	Transportation & Public Utilities	625	3,374	212	23,467	74.7	12.6
50 - 51	Wholesale Trade	1,306	7,820	298	17,649	81.4	30.7
52 - 59	Retail Trade	5,182	26,499	976	65,306	84.2	28.9
60 - 67	Finance, Insurance & Real Estate	1,343	4,744	156	16,889	89.6	21.9
70 - 89	Services	5,975	23,408	583	49,791	91.1	32.0
TOTAL NONMANUFACTURING		17,663	78,657	2,534	188,375	87.4	29.5

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 5

NONMANUFACTURING STUDY
RESPONDING ENTITIES NUMBER AND EMPLOYMENT
BY EMPLOYMENT SIZE GROUPS

Number of Entities

2-Digit SIC Divisions	Employment Size Groups 0-19	20-99	100-249	250+	Total
01 - 09	2	4	1	0	7
10 - 14	1	2	1	0	4
15 - 17	20	23	5	2	50
40 - 49	4	13	4	8	29
50 - 51	12	22	8	4	46
52 - 59	35	60	8	22	125
60 - 67	10	14	8	10	42
70 - 89	38	41	15	29	123
TOTAL NONMFG.	122	179	50	75	426
% Response of Sample Size Group Contacted	69.0	83.6	68.9	72.8	

1978 Employment

2-Digit SIC Divisions	Employment Size Groups 0-19	20-99	100-249	250+	Total
01 - 09	3	121	153	0	277
10 - 14	6	104	113	0	223
15 - 17	86	677	725	651	2,139
40 - 49	28	568	552	5,087	6,235
50 - 51	69	776	1,113	1,840	3,798
52 - 59	162	3,838	1,238	11,780	17,018
60 - 67	36	611	1,266	6,885	8,798
70 - 89	148	1,510	2,247	18,482	22,417
TOTAL NONMFG.	538	8,235	7,407	44,725	60,905

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Table 6

NONMANUFACTURING STUDY
RESPONDING ENTITIES NUMBER AND 1978 EMPLOYMENT
SMALL AND LARGE EMPLOYMENT SIZE GROUPS

2-Digit SIC Divisions	Name	Small (0-19)		Large (20+)	
		Number	Employment	Number	Employment
01 - 09	Agriculture, Forestry & Fisherries	2	3	5	274
10 - 14	Mining	1	6	3	602
15 - 17	Construction	20	86	30	2,053
40 - 49	Transportation & Public Utilities	4	28	25	6,207
50 - 51	Wholesale Trade	12	69	34	3,729
52 - 59	Retail Trade	35	162	90	16,858
60 - 67	Finance, Insurance & Real Estate	10	36	32	8,762
70 - 89	Services	38	148	85	22,269
TOTAL		122	538	304	60,752

SOURCE: Pennsylvania Department of Commerce, Bureau of Statistics, Research and Planning.

Appendix D

SELECT BLOCK GRANT COMMUNITY GOALS,
ACHIEVEMENTS AND PROBLEMS

Middletown Borough

Goals

The primary goal of the Middletown Community Development Block Grant program is to rehabilitate the Borough's housing stock and to revitalize the area's economy. The major objectives toward rejuvenating the Middletown housing situation include:

- Demolotion of dilapidated housing in the floodplains.
- Rehabilitation of sub-standard dwelling units using code enforcement as a tool.
- Increasing the number of low and moderate income dwellings, as well as elderly housing units.
- Supporting the development of new housing and functional infrastructure (streets, sewer lines, water lines).

With an aim toward revitalizing the community's services and economy, the objectives are:

- Façade reconstruction and restoration in the central business district.
- Establishment of a full-time medical clinic.

Middletown has received Small Cities Community Development grant monies to supplement the Community Development Block Grant program funds. These dollars are earmarked for projects similar to those for the CDBG monies: rehabilitation, demolition, health and recreation facilities; and street, sewer and water line improvements.

Achievements and Problems

Housing rehabilitation has been completed for 41 units since 1975 under both programs described above. This endeavor totaled $133,836 in grants and $62,700 in loans.

The problems with the CDBG program in Middletown grew out of issues of accountability and responsiveness to citizens' needs. Particularly, the Citizens Advisory Committee for the Dauphin County Housing Authority pointed out problems such as:

- The necessity for a bona fide code enforcement officer.
- Personal selection of contractors.
- A more rigid contract process of estimates and task completion.
- Job inspection before payment.
- Reasonably priced materials purchases.
- More client participation in decision making.

In an effort to address these problems, a Citizens Advisory Board was created as a more formal mechanism for citizen input. Closer coordination with the Dauphin County Redevelopment Authority was also undertaken. Although TMI occurred just as Middletown was receiving its first Small Cities grant allocation, the program proceeded without disruptions. Middletown did attempt to use its proximity to TMI to obtain additional funds under the HUD Imminent Threat Program, but funds were not awarded since HUD did not classify TMI as an imminent threat.

Steelton Borough

Goals

Steelton's community development goals are directed toward upgrading the existing housing stock through demolition, rehabilitation, code enforcement, and new construction. The Borough desired to achieve a more viable balance between different income groups by creating affordable housing, eliminating blight, improving recreation facilities, and revamping the downtown.

Achievements and Problems

Achievements under the Steelton CDBG program include:

- Acquisition of property for future housing.

- Home rehabilitation.
- Installation of tennis courts and a public park for recreation.
- Subsurfacing utilities.
- Resurfacing/reconstruction of alleys.

As was the case with Middletown, Steelton expanded its CDBG program with a Small Cities program grant. The activities under these supplemental funds paralleled that of the CDBG monies: street improvements, new sidewalks, spot demolition, property acquisition and purchase of vacant substandard units for rehabilitation.

Since 1975, 90 properties have been rehabilitated under the Steelton community development programs. Only a few minor grant administration problems (accounting, availability of Annual Performance Report) have occurred in the course of the execution of CDBG funds. These problems have since been ameliorated through corrective actions.

Swatara Township

Goals

Swatara Township's two major priorities are the revitalization of the existing housing stock and various supporting infrastructure projects. In order to meet these goals, the following objectives are to be utilized:

- Financial assistance program to aid in rehabilitation.
- Sewer reconstruction work to eliminate cesspools, and subsequent street repaving.
- Attempt to obtain grant funds to correct storm drainage problems.
- Extend fire facilities and purchase new equipment.

The Small Cities grant program was tapped by Swatara Township to provide additional funds for residential rehabilitation and storm sewer improvements. A feasibility study revealed the futility of a storm sewer system in the floodplain zone, however, so plans for the funds were altered. Subsequently, the funds were used for acquisition, resident relocation, and demolition of houses in the flood damaged area.

Achievements and Problems

Most of the CDBG program funds have focused on the sewer improvements and subsequent street repaving for target areas in Swatara Township. Thus, many of the other objectives have not yet been fulfilled.

The Small Cities program encountered more difficulties as the storm sewer improvements proved not to be feasible. Grant funds were insufficient to cover home rehabilitation as well as acquisition and demolition. Through a grant extension, 27 home rehabilitations have been accomplished, however.

Problems also developed concerning the Housing Assistance Plan's designation of low income, multi-family housing sites. In an attempt to block low income housing concentrations, citizens have pressed for scattered site low income housing. It appears that limited funds and conflicting objectives have placed severe constraints on the progress of these community development programs in Swatara Township.

Harrisburg City

Goals

Since 1975, the City of Harrisburg has been actively attempting to address a multi-faceted series of needs with CDBG bunding. To change Harrisburg's image, objectives were outlined as such:

- Rehabilitate housing through code enforcement.
- Acquire sites for new moderate income housing.
- Streetscape improvements -- trees, street lights, sidewalks.
- Revitalize downtown economic base.
- Upgrade recreation facilities.
- Modernize fire houses.
- Develop environmental management program.
- Develop and implement a project evaluation system for community development programming.

Achievements

The Harrisburg rehabilitation program has awarded 1,253 grants and 162 loans. A total of $782,469 has been given in grants and $320,515 has been loaned.

With respect to the rehabilitation program, additional personnel were hired and site offices for code enforcement have been established. Demolition has been restructured to encompass a formalized set of steps for substandard housing removal. Sixty-six units have been demolished under this program. The Pennsylvania Department of Community Affairs has contributed $100,000 to the demolition program under a partnership with the City.

A land use and housing survey was completed for a Harrisburg Neighborhood Strategy Area in order to initiate rezoning alternatives. Harrisburg City Council legislated a property reinvestment board for blight elimination. An Our Block Together Program was initiated in 87 blocks covering 862 structures to provide dollar incentives for home rehabilitation.

Recreation needs were significantly addressed by the assignment of a recreation planner to select sites for possible park development. Funds have been obtained from the Federal Urban Parks Program as well as $10,000 from the Pennsylvania Fish Commission for city parks rejuvenation.

Experimental street furniture is being installed to embellish urban neighborhoods. Other superficial environmental uplifts include new street lighting, street tree planting, and sidewalk improvements for tree-damaged sidewalks.

Problems

Many of the problems which occurred in the administration of the CDBG program have centered on setting up systems for the rapid transmittal of funds for rehabilitation work and relocation assistance. Sufficient personnel to administer these programs efficiently has also been a detriment to progress on the various projects.

Problems have emerged for some projects (i.e., park development) due to delays from local political bodies, both in terms of necessary resolutions and local funding matches.

The lack of neighborhood organization involvement has impeded citizen input for such programs as rezoning plans and the

neighborhood code enforcement/rehabilitation incentive program (Our Block Together).

Many of the problems discussed may have simply emanated from trying to allocate resources over widely disparate community needs. The system mechanisms have not been in place to efficiently identify needs, construct plans, and administer funds.

Conclusion

The overview of Community Development Block Grant recipients shows no TMI-related impact on funding or program execution. The problems which have emerged cluster around the development of a systematic approach of project administration from a number of points:

- Action plan steps to accomplish desired goal.
- Elected official support for proposal.
- Sufficient funding to address the project at hand.
- Sufficient trained staff to administer.

Hopefully, the Pennsylvania Department of Community Affairs can continue with technical assistance to these communities to bolster efforts to organize community goals along the steps outlined above.

Errata Sheet

The Socio-Economic Impact of the Three Mile Island Accident

Section 8.1.2. page 142, last sentence
delete the word "extraordinary"

Section 8.1.3. page 142, first indented paragraph, fourth sentence,
change $49.2 million to $52.16 million

Section 8.1.3. page 142, second indented paragraph,
change first sentence to read, "Set a levelized energy charge of 8.8 mills (8.4 mills plus gross receipts tax). In May 1979, the energy charge had been 3.1 mills." Delete rest of paragraph.

Section 8.1.3. page 143, first sentence,
change TMI-2 to TMI-1

Section 8.1.3. page 143, fourth indented paragraph,
delete "to alleviate the hardship of removing TMI-1 from rate base" insert "to make the company's energy cost recovery current"

Section 8.1.4. page 145, at the conclusion of the last paragraph,
insert "However, the PUC has strongly ruled on numerous occasions that customers should not and will not be made to pay the cost of the cleanup."

BEST AVAILABLE COPY

1

THREE MILE ISLAND AREA

LEGEND

10 MILES FROM TMI

MUNICIPAL BOUNDARY

COUNTY BOUNDARY

DRAINAGE FEATURE

4 2 0 4 MILES

SCALE

prepared for OFFICE OF POLICY AND PLANNING

11 / 79